ESTHER DYSON'S MONTHLY REPORT

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PC Forum Documentation: Text Comes Alive!

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BY ESTHER DYSON

Welcome to the documentation for the 2003 PC Forum: "Who? What? Where? Data comes alive." Our thesis this year is practical: People want answers, not exotic ways of asking questions. More than ever, money spent on technology needs to be justified: What answers will we get, and what will they do to improve our results and reduce our costs? (Results in business are usually measured by revenues and profits; in government, by effectiveness and visibility.)

Under the covers, the techies may be outwitting the pragmatic business guys after all. While we're collecting and tagging all this data in the guise of efficiency and agility, we're also building the infrastructure that will be required for the Semantic Web, the vision of a Web that comprises meaning and intelligence along with data. Just as DARPA's projects led to the Internet, and commercial spending led to the proliferation of PCs that connected individuals and allowed the World Wide Web to happen, so government spending on security and business spending on data management will allow the Semantic Web to happen. But we don't want to focus on it yet, because it is still as far away as the World Wide Web was a decade ago.

Regardless, data infrastructure is starting to proliferate, ready for the tools that can start linking the modules together: better metadata about data, a more seamless communication infrastructure, better search, classification and analysis tools. Moreover, customers will start demanding all these capabilities. While most discussions of the Semantic Web seem to settle on the ease of making travel arrangements, there's a lot more in store. Imagine querying your open orders: Your software will have the intelligence to crawl up your demand chain and notice that your customer A, buying direct-

{ *continued on page 2* }

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ly from you and through distributors B, C and D, has ordered the same goods several times over. (Could have been helpful towards the end of the last boom!) Imagine being able to change production schedules easily in response to a shipping accident, seamlessly replacing one provider's production with equivalent goods from another, while shipping and packaging systems respond appropriately. Or, as IBM's Ginni Rometty mentions in a real-life example, when an insurance company gets a medical claim it will not only process the payment but also ping the treatment system to make sure the patient gets the right treatment for the particular mix of conditions it knows he already has.

Although this is a challenging time for our industry, we are quietly making huge progress. With less focus on what is *new new new*, customers and vendors are beginning to link together systems that already exist, leveraging the information that is already there and bringing it to life.

The hard times don't necessarily mean a halt in spending. They do mean very careful spending; vendors and budgeters have to be explicit and precise about the benefits they promise. And this means, ironically, that now is potentially an extremely fertile time for our industry. With less marketing hype, developers are more focused; they don't have the resources to be all over the place. People are driven by passion and clear goals, not by vague visions of glory or IPOs. Small companies are less likely to have competition, and so they are more likely to be spending their meager funds on development than on PR that generates visibility rather than understanding.

Please enjoy the next few days – and pages – as we attempt to assemble the Forum's richness of people, imperatives and technology into a living whole.

The Forum is organized into a series of panels and interviews in the mornings, and showcases and demonstrations in the afternoons, over three days. Below, we provide an introduction to all the companies and people who will be part of this year's event. Most sessions are moderated by Esther Dyson, with exceptions noted.

SUNDAY, MARCH 23

The conference opens with comments and discussion with two industry leaders, each a standard-setter in his own way.

INTERVIEW – Intel Ahead!

Paul Otellini, Intel

Intel sits inside much of the hardware that this industry runs on. Under ceo Craig Barrett (a speaker at last year's Forum) and president and coo Paul Otellini, Intel is doing two significant things: It is continuing to invest heavily in R&D as well as production, and it is directing a lot of that money towards communications, specifically WiFi and handheld devices. Otellini, who in his 29 years at Intel has worked principally in product development and sales & marketing, is bubbling with enthusiasm: "We've got our first two converged [computing with telco] products. We've seen nothing like this before; we're launching Centrino for WiFi and Manitoba for data-enabled cell phones this quarter. We've had more than a hundred design wins for Centrino – which compares with about 30 for the Pentium 4 mobile."

He continues, "Everyone [manufacturers] who uses Intel is using Centrino, and new wins are coming in. It's at the high- and low-end, thin, light, multiple SKUs. . . . Technology spreads on top of the lowest common denominator; you need to write for a platform that you can count on being everywhere. Now it's happening: Software vendors that didn't have mobile versions are rewriting their applications for WiFi."

Overall, Otellini sees mobility driving Intel's market, whether it's the ability of people to move their laptops around, or the increasing popularity of data-enabled cell phones and communication-enabled PDAs. The challenge is not just to integrate different functions on a chipset, but to optimize other features as well, so that your wireless device also has a long enough battery life to go cordless for a reasonable period of time. "Once you go wireless you never go back," he predicts.

The demand for WiFi is worldwide, he notes. He sees 40 percent of incremental sales for Intel coming from emerging markets over the next five years, and they are just as interested as anyone in the latest technology: "There's China of course," Otellini says, "and Russia is very strong. There's a second wave in Southeast Asia: Early demand indicators are the same as in China five years ago. In general the model is to leapfrog, so they go immediately to wireless and data-enabled phones faster than the US.

On the cell phone side, take-up is much stronger outside the US. "One hundred percent of all the cell phones in Japan support Java, data and color, and most have a camera. In Europe, it's only 30 percent and in the US about 10 percent. It's a very clear pattern. The US will adopt the same capabilities, but there's a lag. Blame it on the non-uniformity of the infrastructure," he says.

Intel, which has an interest in Cometa (SEE PAGE 51), is enthusiastic about the new wireless world: More and more of the intelligence will be residing in the kinds of devices it makes. "The traditional POTS [plain old telephone service] suppliers are moving to take advantage of WiFi by connecting access points to their existing broadband infrastructure – especially in Europe. The next challenge will be to develop infrastructure to allow seamless handoffs as a user roams from one hotspot to another, or from GSM to WiFi and back again. "It's not a technology problem," says Otellini. "The issue is all the protocols and the billing systems. I don't think these suppliers have thought through the implications of roaming Voice over IP yet."

What's most exciting is not Intel's technology, but the ethos underneath it. The spread of standards fosters innovation. Currently the wireless world is where the computer world was decades ago: You have to write for a specific platform, and worse, you need to rely on a particular operator to roll it out to a customer base. But those days should be over soon.

INTERVIEW – One World, Under Oracle

Larry Ellison, Oracle

Data is his middle name. Larry Ellison founded Oracle 26 years ago, and is one of a very small club of industry leaders who are still running their own companies two decades later. Although he takes time off to sail, he's leading the company almost single-handed (after a succession of number-twos who didn't take), and enjoying the challenge. Says he: "We think it's the information age, not the operating system age. The OS manages hardware; we manage the software."

Oracle the database has changed as much as Oracle the company since the days when it was pushing a new standard called SQL. The database now offers a suite of features to store and manage all kinds of data in addition to the familiar column-and-row tables: e-mail, documents, Excel spreadsheets, etc. However, only about 1 percent of the company's 250,000 corporate customers take advantage of them, says

Ellison. "It's easier to introduce a new product, than to explain the old thing does more than it did. . . . If I want to find out all my interactions, all that information should be stored in a way that it can be found and shared. We have an XML database with a file system on top of it. We have an interface to IMAP for e-mail."

But as far as the end-user is concerned, it's conveniently invisible: "If you use Oracle to store e-mail, the user still sees Outlook. We're just the storage mechanism behind the scenes. The more different repositories you have to manage, the more difficult it gets. So we simplified: At Oracle, we replaced 2000 NT file servers with Oracle around the world; we replaced all our e-mail servers with two Oracle databases. Companies are organized in this very peculiar way separated across national boundaries; so were we until four years ago. We moved to this new organizational structure, and now everything's all in one seamless database [distributed] around the world. We make so much more money than anyone who doesn't have a monopoly. (Microsoft is in a separate world!) We made 35 percent operating margins last year [and 34 percent in the last quarter, despite lower revenues]. How we're organized makes us a million times more efficient. Any company that adopts this structure will do better."

He goes on: "The biggest problem in information processing – whether automating a company or protecting a country – is data fragmentation. Other people have hundreds of separate databases, and they pay extra not to know what's going on! to keep their information unintegrated!"

Ellison has a clear vision of the benefits of data integration, and dismisses most privacy concerns: "So where is the biggest threat? Terrorists? or the US government? In the US, we have this 200-year history of protecting ourselves against our government. But is the real risk that our government is going to come after us? Or that a nuclear bomb will explode in lower Manhattan?" (But will a unified database prevent it?)

He continues: "We should go to the INS, all of law enforcement, and put everyone wanted by the police, everyone we think is a crook for whatever reason, every bad guy, all the people we want to arrest, or whose whereabouts we'd like to know, into one database. Right now, when a cop stops someone – which happens to me from time to time because I drive too fast! – they check him out but all they've got is local information. I think there should be one place to go to look. That's one very simple example: Had we had that in place, we would have caught 11 of the 19 terrorists."
"We as a society have given up a lot of privacy to make shopping more convenient. That's a fair trade. Now we have to stop making it difficult for government to protect us. I'm constantly accused of supporting the notion of a mandatory national ID

card. I don't: You can opt out. All I want to do is to make our existing IDs more difficult to forge. When you get on an airplane, don't you want the airline to know who's on there with you? I suppose we could have airlines that check and airlines that don't and people could decide which airline they want to fly. Take-a-Chance Airlines wouldn't check people's identity or search their bags for guns or bombs. I don't think I'll fly on that airline."

INTERLUDE – Tele-Music

Chris Chafe, Stanford University

Chris Chafe is director of Stanford University's Center for Computer Research in Music and Acoustics (CCRMA, pronounced karma). He started out composing music and playing the cello, and then got involved in computer music in the mid-70s, a time when composers started experimenting with synthetic sound. In 1978, he says, "That led me to Stanford, which was one of the few places for computers and music at the time, and I've been here ever since. I started thinking about network quality seriously three years ago. It became clear that there were networks stretching around the globe that had the capacity for super-high-bandwidth collaboration. Musicians love to play together – why not be able to do it at a distance?" He started thinking about what kinds of tools would be useful for assessing quality, and he came up with the obvious answer: music. He uses music and human auditory acuity as a way to make small variations in quality perceptible to humans.

Listening to the network gives you an intuitive assessment of the quality of the connection. You can also test a particular network host's response time. While people usually use technology to mask imperfections in a system, Chafe uses it to accentuate whatever deviations from perfection a particular network path and site response displays. If you take a particular sound, whether it's a music sample or a perfect gong, and then alter it to reflect a network's characteristics – latency, fuzz, whatever – the deviation is clearly audible. A steady bong bong bong, for example, may turn into a sagging boing. . .boing. . .boing. . .over an unreliable network. Send the same ping to another, more responsive site on a good connection and you'll hear bingbingbing!

In the end, you have to hear it to appreciate it – which you'll get a chance to do at the Forum. After you hear Chafe on stage, come visit him outside where he'll take special requests. Then you can try out your favorite piece of music, as mediated by your favorite piece of network infrastructure.

MONDAY, MARCH 24

Today we talk about data from three perspectives: government and security, enterprises and individuals, and the real world with its profusion of rich and complex data.

PANEL – Data at Large: Watching the World

Both business and government are obsessed with data – call it information awareness. Yet, even as we worry about government knowing too much and perhaps abusing that knowledge, we also have to worry about government knowing too little. . .or not knowing what it knows. The challenge is to get better at tracking real problems, at the same time that we get better at avoiding privacy breaches and abuse. Right now we know too little that's useful, even as many people have too much access to what is not.

It's relatively easy to collect lots of details. Governments, merchants, banks and credit card companies have been doing that for years; now Websites, ISPs, supermarkets, bridges, tollroads and cell phones are adding to the picture. The tough part is aggregating data by individual and finding patterns, whether to identify all of an individual's activities, find links, discover anomalies or predict behavior. That means combining data from different sources to determine whether Juan M. Tigar who lived in Alice Springs in 1993, is the same person as Joan Tiger, now of Wayland, with the same birthdate.

*Such data collection and analysis means being able to follow the progress of things you want to track in real-time, whether people or packages, by activity or location – as MapInfo can do. It means better visualization of the data – such as offered by the tools from Anacubis, Cataphora, Fractal Edge, Groxis and Microsoft being presented in the afternoon – as well as the more complex modeling capabilities of Unicorn Solutions (*PAGE 24*), and Network Inference and enLeague (*ON THE ONTOLOGIES SHOWCASE PANEL; PAGE 88*). From a technology point of view, the government's interest – and its spending – is likely to lead to a halcyon period of technology development and deployment.*

So, the solution to the lack of knowledge is better technology; can the solution to too much knowledge lie in use of technology, too – to implement good policies? The ultimate answer requires agreement on the right policies and on how to define "useful." But technology can indeed help to implement the policies and to gather the information (or metadata about the data) required to stop abuse under whatever policies are promulgated. Right now, the information exists all over the place, inaccurate and fragmented. What's technically possible? Ellison's answer is to put it all into a single (Oracle) database; others, including the Markle Foundation in its recent report, "Protecting America's

Freedom in the Information Age," posit the virtues of federation, just-in-time matching and better coordination of efforts across data structures. (Esther Dyson is a member of the Markle task force that produced the report.)

But in the middle of all this data, there's also the question of what to discard – because it's useless, because it's distracting, and yes, because it's private and no one else's business. In the current paranoid environment, the tendency is to save too much, because you never know. . . . Taking that tendency to its conclusion, we should also save information on who generated the information, how it got into the system in the first place, and who looked at it. The antidote to surveillance is. . .more surveillance?

Robert Carter, FedEx: Absolutely, positively knowable

Our panelists come at this topic from a variety of perspectives. Robert Carter is cio at FedEx. As its former cto, he is a gadget freak and is behind many of FedEx's more exotic innovations, including digital pens that write with ink and store a digital image at the same time. He's also leading the way with the company's newest tracking functions. Tracking things is the very foundation of FedEx's business. Tracking events are used either to keep customers informed or to follow up when things aren't quite as they should be – whether it's delayed aircraft or misaddressed packages. Without the technology, FedEx couldn't afford to do this at all, says Carter. "If you pick up the phone and call 1-800-go-fedex and talk to a customer service rep, it costs us about $2 a call. At fedex.com, people are tracking packages 2.7 million times a day, and it costs 2 to 3 cents per track. People are using the public network instead of our frame-relay facilities, and paying for it themselves. If just 5 percent of those Web sessions ended up in a call center, it would cost us $30 million a month more."

Virtually none of the people who check on their packages are strangers; FedEx makes a point of knowing who its customers are. "We have a very focused effort on security these days," says Carter. "We put in a pretty powerful executive position. The chief information security officer reports to me, but he also reports to the board, just like an internal auditor. Nothing moves through the FedEx system anonymously; it's all tendered at a known point by a known shipper. While there are walk-ins, they give us a lot of information. We constantly work with the DEA, the ATF, the FBI and other agencies around the world to help catch the bad guys. Even at that, some of the coolest things we are doing are things we'd rather not have everybody know."

That makes it sound as if any terrorist or crook with smarts would use the Post Office, but FedEx is working closely with them, too. "They are a big customer of ours

and we talk to them a lot about these things." In theory, the kinds of systems FedEx has developed at great expense could be applied by the Post Office, spreading the costs over a larger base.

It's Carter's job to think of risks and guard against them, and he sees plenty: "Right now, if people really understood all those risks, they would be more concerned. I don't think people understand how much cargo is shipped in the bellies of planes, or the number of ocean-going containers that cross the borders uninspected daily. Every tunnel and bridge is a vulnerability."

Mark Cattini, MapInfo: A man who knows where he is

Mark Cattini, ceo of MapInfo, does not come from the world of maps; he sees location information as part of the regular world of data. Previously, he worked at Lotus Development in the UK for nine years. Then when IBM acquired Lotus in 1995 and Cattini started looking around, a friend sent him a brochure from MapInfo that – yes! – changed his life. "There had just been big floods in the Mississippi, and they showed a map of where the river banks had burst dotted with the locations of some insurance company's policyholders," he recalls. Cattini was enthralled and joined the company as general manager of the UK office. He became president and ceo in 2000.

Much of MapInfo's technology is focused on integrating geographical information into standard applications – everything from CRM to weather, retail store planning and the like. The business ($93 million in revenues last year) comprises three units: Location-Based Intelligence, Analytical Customer Relationship Management, and Location-Based Services for the enterprise and mobile devices, often associated with telco spending. That last business has been slow, so MapInfo is focusing on the first two. It recently acquired Thompson Associates, a provider of location-based analytical services and business intelligence software for the retail, restaurant and real estate sectors, with about $17 million in annual revenues (which will more than double MapInfo's $10 million from that sector). Thompson's largest customer is Home Depot, which uses the company's products to enhance sales tracking, merchandising and other functions that depend heavily on everything from weather patterns and local building trends to demographics and traffic patterns. It also sells to the Gap, Wendy's, Citibank and Safeway.

"There are only so many ways you analyze information: quantitative, time series, classification. . .and then there's location," says Cattini. "Geography gives you a unique way of analyzing data. For example, you can record times of sales and kinds of

products, but when you look at a map, you see so much more. MapInfo adds meaning to other data rather than replacing it. We had the sense not to fight the standards battle. We add location-based intelligence to data that wouldn't otherwise have it."

Like everyone else in the business of analyzing real-world information, MapInfo sees a big market in homeland security. "We're focused on building awareness of the relevance of location for security. For example, we have provided the New York Police Department with a whole set of location-intelligence tools. We have an application that deals with bioterrorism: It shows the readiness of a hospital with color coding. You can see the number of beds by the size of the icon, the population density of the affected area, emergency access routes, and so on. And you could incorporate third-party weather data or information about water flows or whatever else you want."

Jeff Jonas, Systems Research & Development: Las Vegas smarts

One of the leading companies in the technology behind people-monitoring is Systems Research & Development (SRD), founded by chief scientist Jeff Jonas. SRD comes from a world of high stakes and mistrust: Las Vegas. Some of its first customers were casino owners eager to detect and track threats to their businesses – individuals with unsavory connections, criminal records or some other indication of trouble. "People in the gaming industry have been facing asymmetric threats for years," says Jonas. "Highly organized cheating rings are constantly recruiting new people, sometimes even a casino's existing high-rollers. If someone in the [authorities'] black book steps into your casino, you could lose your license." But, says Jonas, "It's pretty hard for a Las Vegas tech company to go to Washington and be trusted. [Investor] In-Q-Tel [below] really helped us open the doors." The company had $7 million in revenues last year, and is on track for $15 million this year.

At first, SRD seems like a techy's dream, and a privacy advocate's nightmare. Its software uses all the smarts it can apply, and links everything – from decades of addresses and transaction records, to information about co-workers, public records, and whatever else anyone can discover and feed into it. The modus operandi is not to resolve contradictions, but to keep them open; that is, even if you conclude that Juan is Juan and not Joan, you don't throw away the "Joan" record in case somehow it comes in handy later. Something in there may assume relevance after all. Or you may want to go back and take another look at all the information from a particular source you no longer trust.

The distinction of SRD's software, called NORA (for Non-Obvious Relationship Awareness) is that unlike traditional data-mining, going through millions of static records in a database, NORA identifies non-obvious relationships just-in-time. When a man walks into a casino, NORA identifies within seconds whether he is on a bad-guy list and or has any "non-obvious relationships of concern" with casino employees or vendors. Obviously, it could do the same for an airline passenger.

The software can handle huge amounts of data. Its largest implementation to date is beginning to digest 15 billion records related to 300-plus million people, working at about 300 records per second. Later on, it will look for new links in real-time.

SRD's Strategic Infrastructure data warehouse software is going through that database and identifying duplicate individuals using a large set of clever matching techniques. "It's not like two Social Security numbers that are the same," says Jonas. "That would be pretty lame." It's matching addresses, credit card and driver's license numbers, employers, and all kinds of other data, using intelligent techniques that allow for misspellings, abbreviations, alternate formulations and plain old errors. It is also good at eliminating false positives; five different John Smiths, for example, may all give the same number for travel reservations because they all use the same travel agent. Finally, notes Jonas, you'd definitely want to ask questions about someone claiming to be a 37-year-old man born in the US showing up somewhere with a 6-month credit history, a 5-month-old driver's license, and no other records to his name. Such things can happen, but it's more likely a manufactured identity than someone who just decided to join society after 36 years.

SRD also has a privacy-supporting aspect, Jonas hastens to mention. When you think about it, it's obvious the government doesn't want its watch lists out in the clear anyway; that would tip the suspects off. So Jonas has come up with the notion of "anonymous entity resolution," where the government can freely send out a hashed watch list, which would quietly note matches and send them back somewhere without alerting the local operators. And here's where, as In-Q-Tel's Gilman Louie says [below], you need not just one piece of software but a coherent system. You can't have silence and then suddenly have the system firing off e-mails to the FBI, even if they're encrypted; you need to maintain some kind of periodic traffic with encrypted empty messages so that when there actually *is* a message to send, it won't be noticed.

Gilman Louie, In-Q-Tel: The CIA comes alive!

Gilman Louie, ceo of the CIA's In-Q-Tel venture fund, has become the VC to know this year. His portfolio includes about 25 companies; two of them are at the Forum, including SRD (above) and Stratify. It seems that every little start-up that manages data is now a "Homeland Security" company. And in some way, they all are. Data is the raw material. In-Q-Tel is funded by the CIA, but many people believe that if its efforts are to make any sense, In-Q-Tel should have a broader set of backers. And now it does. "NIMA [National Imagery and Mapping Agency] has started to fund us," says Louie. "Other government agencies have given us funds on a program-by-program basis, and DARPA has also come to us for specific things. The Department of Defense is looking at establishing its own fund, and is looking to us for advice."

"The pieces exist, but no one has assembled them in a way that supports effective sharing," says Louie. His goal is to get the portfolio companies to interact in a way that they would not if they were all just selling individually to the CIA and other agencies. "Second, we're trying to have an impact on the policy side. People may not be aware that each of these organizations has standing policies about the use of data, and that the policies don't necessarily match up. The CIA or any of the US foreign intelligence services can't use US citizens' data. However, in the course of analyzing a non-US target, the path may take you through US citizens. We need tools that protect the integrity of such policies while enabling the agencies to do their work."

"By now, the agencies are pretty gun-shy," says Louie. "They don't want to share too much, so they share too little." Or at least, the ones with integrity behave that way. "Separately, how do you get the FBI, which is prosecutorial, to do analysis, and how do you put guidelines around people doing analysis so that they aren't doing prosecutorial things? The answer is having accountability and authority and audit built in, following consistent policies."

"You need a system that actually does the audit. We could have that, but we need to step back and design the system holistically. I think we could do this in under three years. That's pretty short by government standards, but we need to get started. Without such a system, we put civil rights at risk, or we'll be vulnerable to terrorists."

Accordingly, says Louie, the criteria In-Q-Tel uses to select its portfolio companies and the guidance it gives them focus on these issues: analysis of mostly unstructured data, sharing of the data, and policy tools. "We can do a lot," he says. "We can require the policy tools to be built into the systems of the companies that we are funding. It's easy to sell control to security guys!"

PRESENTATION AND PANEL –

Identity Management: Who's in Charge Here?

Jamie Lewis, Burton Group: Fostering the identity revolution

We asked Jamie Lewis to moderate this panel because we could think of no one better to do the job. He saw the emergence of the identity management field back in the late 80s when he was at Novell in strategic marketing. He recalls, "One of Novell's biggest weaknesses was that the bindery [its directory] was per-server, while Banyan competed with us with a global directory called StreetTalk [whose developer was Jim Allchin, now at Microsoft]. Novell was on its way to having one when I left, but when Craig [Burton] decided to leave to found the Burton Group, I jumped at the chance to join him."

Their mission was to define what it would take to develop a distributed architecture that would really work: directory and security, he says. "We used to say that security is directory's evil twin. You can't have a distributed directory without security, and you can't have security without a distributed directory." Now, of course, "directory" has been extended to encompass all of identity management and the issues that go with it. Burton Group has grown to 55 people. It counts among its 400 clients half the Fortune 100 and 25 percent of the Fortune 500, plus a small but growing number of European companies.

"We still have the same problems, but we've made more progress in the last two years than in the previous ten," Lewis says. "The market is selective in getting into place what it needs, but now there are strong market drivers: Web services are enabling a more distributed, virtual enterprise and there's a need to secure it. Location doesn't work anymore to define network access; it all depends on who and what, not where.

"The trend is everywhere. Large retailers such as Target and Wal-Mart *[SEE PAGE 25]* *are requiring suppliers to plug into their procurement systems. In financial services, Merrill Lynch is a well-known example of a company doing a lot in Web services* *[PAGE 44]**. At another of our financial-services clients, the audit committee of the board of directors got deeply concerned about what was going on inside. When a board authorizes heavy-duty IT projects, the usual resistance begins to disappear! Five years ago, techies were trying to get money for directories, but management just heard them asking for an object-oriented, hierarchical, X.500-compliant directory, and they would say no. Not anymore. All the new regulations – from the SEC, FDA, HIPAA – are implicitly asking for it."*

"It's fascinating to watch how it evolves," he concludes. "And it matters. I'm not a privacy zealot, but I'm concerned about what identity management in the wrong hands could do. I'd rather be involved and help shape it than just stand by."

Identity management: Who's in charge here?

BY JAMIE LEWIS, BURTON GROUP

Identity management is not new. (SEE **RELEASE 1.0**, JUNE AND JULY 2002.) In the physical world, organizations of all types use passports, driver's licenses, Social Security numbers, birth certificates, and other identifiers to track and verify the identities of people. Governments track individuals for all sorts of reasons, including to ensure tax payments. Companies have to identify employees, customers, contractors, and other business constituents in order to conduct business and comply with legal obligations. The first step in securing computer systems and applications has always been to create a login ID, and then to associate access controls with that login ID.

But physical forms of identity verification can't enable business, entertainment and social activities on the Internet. We need digital forms of identity that can flow across virtual connections and extended transactions. Where today most companies manage identity on a per-application basis, identity must become more persistent through the continuum of any process, not just across multiple applications, but across multiple organizations. Only then can it provide the predicates for security, regulatory compliance, liability management and other core business requirements.

How we create, use, store and verify identity in this new context is a complex question. It raises a large number of thorny issues for individuals (including privacy), corporations (including the regulation of core operations), and governments (laws, regulations, treaties). How much control individuals will be able – or will want – to take over their digital identity is the subject of intense debate. "Privacy people, their dream is perfect anonymity, because then there's no privacy problem," says Craig Mundie of Microsoft (below). "On the other hand, security people say we have to have absolute true identity, because without that we can't chase the bad guys."

While many agree that federation is a practical way to achieve interoperable identity, we are just now defining frameworks for pair-wise relationships between businesses and are still far from the necessary international framework for federating identity. It's clear, however, that the market is driving vendors inexorably toward federation and interoperability. The Liberty Alliance took the first steps toward defining a workable federation model last year. Microsoft has now announced partial support for the Security Assertion Markup Language (SAML), the emerging standard for federating authentication across multiple sites. The SAML community quickly showed support for WS-Security – a Web services security standard that IBM,

Microsoft, and VeriSign have championed – as a security envelope. All indications are that future versions of the Liberty Alliance spec will support WS-Security as well.

Much of the current activity around identity management is occurring in the enterprise, where regulations and business needs are combining to require solutions. Enterprises are creating both inward- and outward-facing systems that tie employees, customers, partners, suppliers, contractors and other constituents into their business processes. In other words, identity is following business into the digital domain, and that makes the enterprise a pioneer in the quest for digital forms of identity and effective tools and rules for managing them.

PRESENTATION – Mondo Mundie
Craig Mundie, Microsoft

Microsoft cto Craig Mundie will set the stage for the panel, illustrating the distinctions among identity, authentication and authorization, and showing federation in action. "You need to do things differently in different contexts," he says. "We see three broad environments: government, where you don't have any choice about giving up your identity; the Web, a public environment where people may want a certain level of anonymity; and commercial, where there's some kind of voluntary relationship between the individual and an organization." Mundie includes intranets/employee-employer relationships in the last environment, though one could argue that they belong in another category.

Mundie took responsibility for security and privacy issues at Microsoft several years ago, working on Microsoft's Trustworthy Computing initiative among other things. So he's deeply involved in digital identity issues and sees identity as a foundation element: "Computing is becoming indispensable, and that means it must ultimately become as trusted as telephony and electricity are today," he says. "Trustworthy computing is more than just security. It's privacy, reliability and business integrity as well. Digital identity is a crucial building block for trustworthy computing."

"If you give someone a digital identity, they want to be sure it isn't spoofable. What you do with the identity is a business integrity issue as well: Are you just meeting the letter of the law, or are you doing something that meets the ethical requirements, or the business expectations, the user has? There's also a tension between the needs of the business and the privacy needs of the individual. These aren't issues for Microsoft alone; they're issues for the entire industry."

Microsoft has put itself in the identity spotlight with Passport, which provides a centralized identity service that other applications and services can use. In the consumer arena, Microsoft is tying all of its own services into Passport. For example, Microsoft leveraged Passport in MSN8 to create a set of controls tied to Passport IDs that allow parents to determine what sites their kids can visit, whom they can talk to, and other aspects of Internet usage. Microsoft used Passport to reconcile diverse values of different cultures and individuals in one product by localizing the imposition of constraints on usage at the family level.

In the enterprise software market, Microsoft has several identity efforts under way. These include TrustBridge, which will federate security between companies; partial support for SAML as well as Kerberos and other security tokens for sharing authentication information between systems; and WS-Security. The company's Next-Generation Secure Computing Base (formerly Palladium), a security framework that allows a hardware-based chain of trust which can be used to improve security of identities as well as code, cuts across both its consumer and enterprise efforts.

Mundie also notes that the notion of identity must transcend people. Computers, and the software that runs on them, are becoming proxies for people and how they operate in society at large. That requires "a blend of the identity of the machine and the identity of software," he says. "Then we have to confer [on this blend] the identities of people so the machine can be authorized to take action. And that has implications for personal privacy. . . ."

He continues: "We see great benefits accruing from solving some of these problems, but we recognize that they're hard. They're not only technologically hard; they're hard from a policy point of view. There'll never be full alignment between where we are in our technological capabilities and where the laws and societal norms are. The technology leads. The norms are trailing close behind as a function of people's use of the technology. The laws then come in an ex post facto way, clarifying ambiguities where the norms aren't prescriptive enough or where people are trying to mine the opportunities that exist at the seams in these things."

Michael Barrett, American Express and Liberty Alliance: Publius was here!
At American Express, Michael Barrett works with internal business units and their business partners on consumer-facing Internet applications and long-range strategic planning for on-line services. At Liberty Alliance, he's president of the Management

Board; when Eric Dean, then United Airlines' cto, stepped down as Liberty president last year, Barrett took over the leadership.

At first, the Liberty Alliance seemed like yet another "anti-whatever-Microsoft-is-doing" organization. Had it not overcome such a negative approach, its prospects would have been dim. To its credit, however, its leadership worked hard to change that perception and establish a realistic and positive mission for the Alliance. Still, many in the press continue to position Liberty Alliance as a direct competitor to Microsoft's Passport, even though it's not. "The Alliance has no interest in operating a competitor to Passport and never will," Barrett emphasizes. "It espouses a federated model, outlining how we can move toward interoperability and standards."

Liberty released the first version of its specification in July 2002, and recently updated it to clarify some ambiguities that had confused developers. In addition to the technology issues associated with federating identity, Liberty has focused on the business side. "The technology aspects are interesting and complex, but in a funny way, they're the simple part," Barrett observes. "The business dimensions of an inter-company circle of trust are very complex. We've been working on that since the get-go."

Because Liberty is building standards rather than a service, don't be surprised when a Liberty member (or two or three) launches its own identity service to compete with Passport. Many of the companies involved with Liberty are large, consumer-facing corporations. They have no interest in ceding ownership of their customers' identity information. In fact, most of them are already authenticating users as they log into their commercial Websites. And that's really the point: Like everyone else, the folks at Liberty quickly came to the conclusion that there will be a multitude of identity repositories that need to be federated.

"My personal view is that identity providers will emerge from three major industries," Barrett says. "Professional and public certificate root authorities and other companies with roots in the PKI [Public-Key Infrastructure] market will have more success with Liberty technology than they did with PKI. Carriers and ISPs that have large customer bases and have some kind of 'walled garden' will want to be an identity provider for that community, and will need to federate with others. And then there are the financial services companies that people trust with large sums of their money. I believe these three segments form the natural nexus for identity providers."

Now that Liberty has published a specification, the inevitable "what now" questions come up. Its success thus far indicates that customer organizations can (and perhaps

should) be more involved in the standards process. But any future work Liberty does could overlap with efforts within OASIS and other standards bodies, such as the W3C. In short, the Liberty Alliance must soon decide whether it will hand its work over to existing standards bodies and step aside, or become a long-lived standards effort in its own right. One path the organization could take would be to focus on the business problems involved in trust relationships and federation agreements.

"The alliance will evolve over time," Barrett says. "We have no published plans to move maintenance of the standards [to an existing standards body] at this point, but there aren't barriers to it. The Alliance is already becoming a clearing house for best practices and agreements, for discussion around identity management. How we standardize registration procedures, measure them accurately, manage liability – these are very complex issues. And we understand both the problems and some of the solutions needed for a circle of trust. This is already a major focus area for us, and we expect it to increase as time goes on."

Andre Durand, Ping Identity: PICA Rules

Andre Durand jumped into the "identity business" – something he and everyone else is still trying to define – when he joined Jeremie Miller at Jabber in 1999. Jabber had developed an open-source, XML-based instant messaging and presence management system, using a hybrid open-source/commercial strategy.

While it hasn't toppled AOL Instant Messenger just yet, Jabber has seeped into a lot of companies: Disney, France Telecom, AT&T, Bell South and Oracle are all customers. Just as important, Jabber demonstrated how loosely coupled, peer-to-peer systems can work in the wide-open spaces of the Internet. Since it's a collaborative environment, the Jabber experience also exposed Durand to some identity management issues – hence his company Ping Identity (PingID for short).

"No one company has a 360-degree view on our identity," he says. "The identity owner is the lowest common denominator in a world full of scattered identity fragments. That's why I believe identity federation is how corporations will exchange identity information, and why I think identity networks are ultimately the only way to organize something as large as a solution to the identity problem."

To turn his belief into commercial reality, Durand founded PingID in 2001, and announced its PingID Network in 2002. In building an identity network, PingID has

adopted the same hybrid open-source/commercial approach Jabber used. The company has funding from Nokia.

"With the PingID Network we're attempting to scale identity interchange without sacrificing security," he says. "On the commercial side, the PingID Network is member-owned and provides the business framework for identity federation. The members of the network can pool expertise, lower costs, and reduce the inherent risks in identity federation. We're leveraging standards like the Liberty spec, but we're also addressing the business processes necessary to ensure security, reliability and interoperability." PingID also plans to offer members a standardized legal framework for identity federation as well as business services that enable federation agreements.

PingID has also floated the idea of the PICA score (Ping Identity Confidence Assertion), a method of normalizing authentication methods between companies. "Two companies rarely define security and authentication policies the same way," Durand says. "Passwords are a great example. One company may have liberal policies governing the type and length of allowable passwords. Another company may have strict controls over passwords or require an additional authentication method. With the PICA score, we can create a numerical scale that measures such things based on weightings assigned to different authentication methods. That creates a commonly defined scale for the confidence of single sign-on referrals" – assuming one trusts the integrity and reliability of a particular authenticator.

Durand is using the open-source side of his hybrid strategy to jump-start the development of enterprise federation services that can plug into the PingID Network. Under the auspices of SourceID, PingID released an open-source Java toolkit for version 1.1 of the Liberty Alliance Protocol for federating authentication. (SEE WWW.SOURCEID.ORG AND **RELEASE 1.0**, JUNE 2002.) The company has also developed the Liberty Interoperability Validation Environment (LIVE), a test bed for Liberty implementations. With readily available code for federating authentication, companies will – in theory – be more likely to need the services of the PingID Network.

Gordon Eubanks, Oblix: Manage identity. . .or else!

Gordon Eubanks helped pioneer the personal computer industry, and he's bringing that same pioneering spirit to the market for enterprise identity management. After working for Digital Research, Eubanks founded C&E Software, which merged with Symantec in 1984. After 15 years as president and ceo of Symantec, he left to join Oblix in 1999, and will, if you give him half a chance, explain the imperative facing

the typical enterprise: "This isn't optional," he says. "Organizations that can't manage identity effectively and apply it to business processes are going to be toast."

Eubanks quickly realigned Oblix's product strategy from managing user information in corporate directories to security infrastructure and identity management. Today Oblix NetPoint combines Web-based access and identity management tools with basic user management functions, including delegated administration. The most recent NetPoint release also supports SAML. Users can log in once to a process that may operate across multiple sites in multiple companies.

"We're seeing customers doing some very interesting things with these identity management tools and SAML," Eubanks says. "Companies are letting people from other companies into their networks, integrating business processes across those connections, and they're doing it because the business demands it."

General Motors recently chose Oblix as a standard, and Burger King announced a significant deployment as well. GM is using Oblix NetPoint to support GM SupplyPower, a portal for authorized GM suppliers. SupplyPower connects some 17,000 supplier companies with GM, giving over 70,000 users access to the portal (53,000 of those are from GM's suppliers). If GM contracts a manufacturer to supply all the brake shoes for a specific car model, for example, people from the manufacturer can go to SupplyPower to check on production schedules and find out when they need to ship more brake shoes. Designating who could access the portal – and what information they could see – was a laborious and expensive task. GM replaced a home-grown system with NetPoint, using it to delegate portal user administration, first to different levels of administrators within GM and then to administrators within its supplier companies. (SEE PAGE 47 FOR AN INTERVIEW WITH GM'S CTO, TONY SCOTT.)

Eubanks says these new business processes are changing underlying notions of identity and how you manage it. "With these cross-organizational relationships, it's not just goods that are changing hands," he says. "When you're making data in your own business systems available to people outside the company, you have to be sure they're the right people, and they're getting access to the right information. That requires a new level of identity management that most companies don't have."

No company can accomplish that goal with one product from one vendor. While Oblix has remained focused on being a "best-of-breed" vendor, NetPoint has to interoperate, both internally and externally, with a variety of other systems. Oblix has partnerships with companies such as Microsoft (around Web services and Passport)

and BMC (around user provisioning), and supports standards such as SAML, to facilitate integration. But the pressures of market consolidation are building, and the competition is fierce. Through both build and buy efforts, IBM has a set of competing products. Meanwhile, though Netegrity didn't handle its attempt to expand its focus through its portal acquisition very well, its market share remains strong, and Novell is mounting its own challenge with its Nsure product initiative. But Eubanks remains convinced that Oblix's early focus on identity management is an advantage.

He also realizes that Oblix must focus on more than the technology. These new business connections require companies to change the way they work. "Identity management isn't a black box you buy," he says. "It's a set of processes you put in place. It's like when telephones first came into business use. Companies had to change the way they thought about their businesses and their processes in pretty fundamental ways. This is a business issue and it's important that business leaders understand that."

PANEL – On Beyond Relational: What and Where?

Over the past few decades, we have become expert at representing the world in terms of relational databases – everything neatly arrayed into rows and tables that can be manipulated at high speed and with great accuracy. Unfortunately, however, the "accurate" calculations these databases support don't accurately reflect the real world – which is much less orderly and much more complex than our current systems can handle. The complexities come in a variety of overlapping guises, including analog/real world complexities, transformations due to time, location and context, and finally the semantics of data that are reflected only implicitly in the applications that manage the data.

First of all, on this panel, we're not talking just computers and digital data anymore: Devices come in different forms and measure everything from temperature to location to voltage or on-or-offness. They can track identities or run vision systems designed to detect all manner of conditions. Our enterprise systems have to get better at communicating with and interpreting this analog world, as Embrace Networks helps them do.

In addition to all these smart devices, millions of heretofore "invisible" things will become trackable through the use of RFID (radio-frequency ID) tags, tiny chips that will enable us to track anything they are attached to. As Kevin Turner of Sam's Club points out, previously they were priced in dollars and cost-effective only for big or valuable items such as airplane parts, drugs or containers full of lesser objects. Now they are get-

ting down into the cents-per-unit range and can be used to track individual items in a retailer's warehouse or on its shelves. That gives us both the opportunity and the competitive imperative to track individual items in a way that was never possible before.

Second, data and things change their meaning as they move through time and space. Systems must handle simple conversions from, say, centimeters to inches, and also more difficult concepts such as time zones, the definition of a "late payer" or a "standard" size.

When goods move around, they carry a variety of attributes. . .and some of them change. The goods themselves change from incoming orders to inventory to markdowns, and they have manufacturers, repair histories, lot numbers, environmental records, safety issues, prices, components, removable parts and more, which may also change. Some things are fungible; some are unique. Can a generic drug replace a high-priced brand name? As an extreme example of these issues, we recall an old story about a man who would insure and ship a package of a certain weight, and then claim compensation when it arrived empty at the other end. It contained dry ice.

Such tracking abilities also raise privacy issues. In theory, we can track the movements of items after they are bought by individuals, just as we can now track cars through tollbooths – or red lights. Turner says, "We care about RFID-tagged goods right up until they are paid for. After that, we have no interest." But will everyone be so enlightened?

And finally, there's the question of all the information that is represented only implicitly, in applications that manage the data, rather than in the data directly, as Unicorn Solutions's Zvi Schreiber points out. That's where you might represent things such as a privacy policy, or the relationship between a seller and a reseller, or the calculations that confer platinum status on a frequent flyer. How can you ensure that those meanings and constraints travel with the data as it moves from context to context, from one division or enterprise to another?

Maria Martinez, Embrace Networks: Devices come alive

After starting her career in engineering management at Bell Labs, Maria Martinez worked for nine years at Motorola, running two of its most interesting operations: the Digital Cellular Infrastructure Division and the Wireless Internet Solutions Division. That gave her an appreciation for the reality that many of these communicating devices never talk to people; they just talk to other devices. But there are few data standards in the device world, and so she joined Embrace to help it build and market its "device brokerage platform," a sort of middleware-cum-management-

tools suite for the extended Internet of devices. The devices can be anything from a thermometer in a swimming pool to an RFID reader to a security camera in a warehouse to a giant proprietary process-control system, all of them needing to communicate outside their own context.

Embrace's original investors, Techfund and J.P. Morgan Partners, brought her in to change the company's focus from hardware products to enterprise software. Previously, the company had developed a server on a chip, but it became clear to the management team that a key software layer was missing to make the extended Internet a reality. Martinez joined in early 2000 to develop the new strategy. As part of the deal, the company raised $25 million from old and new investors.

Says Martinez: "These billions of devices aren't worth anything if they can't communicate what they're monitoring or measuring – with databases and with all your software, either standard applications or custom software." In short, these devices are the real channel between the physical world and the tidy virtual world of databases and applications. Many of the new applications are in retail, Martinez notes, because there are so many items to keep track of – and the systems to do so aren't yet in place.

She sees a huge future for RFID technology: The tags themselves are pretty standard, though getting cheaper rapidly through progress in manufacturing techniques. But right now there are several different RFID readers entering the market, each interpreting and communicating the data differently (and incompatibly).

But Embrace's business extends beyond RFID and retail to all kinds of physical-world applications. For example, the company is working with a training and testing company (unidentifiable for now) to develop a system that reads student-marked answer sheets locally and transmits the results to the company's computer center, avoiding the time, expense and security issues around extensive paper-shuffling. The company is predicting a 20-times return on its investment.

Most large-scale factories and process plants are already automated, though, using custom-built legacy systems that will someday be retrofitted. Currently, the factory world is something like the old mainframe environments of the 80s; they're still working, and they can ignore standards. But eventually they too will succumb, and just as large companies' back offices will eventually follow Amazon's and Google's lead onto distributed servers, so will their factories ultimately follow retailers' lead onto standard platforms. Embrace hopes to be there when they do.

However, Martinez points out that unlike the computer world, the real world – and the devices that communicate with it – are inherently heterogeneous. "It's not just a question of many different operating systems and architectures, but more important, many different single-purpose devices performing diverse functions. So rather than try to impose a standard or assume that a standard will emerge, we believe this world needs a brokerage function to simplify that inevitable complexity."

Moreover, she adds, "Once devices are online and linking to key existing applications, companies will use them for new revenue opportunities and even business models. These tools will allow them to differentiate themselves, with pay-per-use, or maintenance services, or. . .imagine a suitcase that can never be lost."

Embrace's business model is to charge a one-time server fee of about $50,000 for each new deployment, and then a license fee of a few dollars per device for deployments of a few thousand devices. For larger rollouts, unit prices will drop further. The company had revenues of $1 million last year and expects about $3 million this year.

Zvi Schreiber, Unicorn Solutions: Reasoned translations

Zvi Schreiber, founder and ceo of Unicorn Solutions, appeared in our last issue (SEE **RELEASE 1.0**, FEBRUARY 2003). Unicorn brokers between data-based worldviews just as Embrace brokers between devices, but the software attempts to do so semi-automatically (unlike device brokerage which is still at the manual, fee-per-deployment stage). Unicorn helps large enterprises manage and understand their data in a rigorous way so that it's easier to understand and to develop consistent applications across a variety of business units and contexts. Unicorn's advantage, such as it is, is that it's dealing with the seemingly homogeneous world of databases: Everything is represented tidily in rows and columns. . . .

But of course that's an illusion. "All around the data are applications that give it rigidity," says Schreiber. "Applications are your enemy. If all you had was data it would be easy to be flexible and agile. Applications on the other hand tie you in to specific processes and specific ways of interpreting the data. So when I hear about real-time response and change, I have to laugh." With his client base of large enterprises, companies such as Avis Europe, MetLife, and Boeing, he says, "It's challenge enough to respond to an industry change in one year."

He qualifies that to make the distinction between responses made *by* applications in response to data, and changes made by developers *to* applications or business

processes in response to structural changes in the business's needs or its environment. "It's easy enough to respond to data in real-time – when you're talking numbers and changing amounts or adjusting inventory levels. But changing your business processes in response to structural changes in your industry – what health care has to do with HIPAA now, for example – that's the slow part."

Schreiber wrote his PhD thesis (1993) on reasoning about business processes. . .and came to the conclusion that it was an intractable problem. It still is, he believes, although he would like to tackle it again some day. "You can reason only about very simple business processes, too simple to be of serious commercial interest. This means that the full idea of a real-time enterprise cannot be realized: Computers will not be able to tackle the task of re-engineering processes automatically. But you *can* reason about data, which helps to automate the process of transforming data from different contexts into a coherent body of information." (MORE ON THIS ON THE ONTOLOGIES SHOWCASE PANEL, PAGE 88.)

Unicorn's approach, then, is to try to reduce the applications and business processes it analyzes into to explicit data relationships and taxonomies that can be reasoned about, making inferences about what the data "means." Then the meanings can be adjusted appropriately as the data moves across from one application to another, one context to another, one business partner to another. For example, the various business concepts of price may not initially be defined but simply implemented within applications – with/without tax/shipping/commissions/etc. But if you infer the meanings properly, they can then be automatically transformed to the precise definitions of price expected by each system.

"The idea is to create a less rigid, more complete way of expressing as much as you can about all the data in an enterprise. Then if you buy a new subsidiary, you don't need to rework all its applications to communicate with them; you simply understand how to translate your version of 'inventory' into their version. To put it simplistically, you just query on 'inventory' rather than defining all the tables the system needs to look into to find that out."

Kevin Turner, Sam's Club/Wal-Mart: Don't just handle problems; avoid them!
Kevin Turner, newly installed ceo of Sam's Club and former cio of its parent, Wal-Mart, sits on this panel to remind us that we are not talking about exotic things, but about pragmatic business applications involving children's pajamas, barbecue sets and home stereos, in the context of credit cards, markdowns, same-store sales com-

parisons, out-of-stock levels and merchandising decisions. Fractions of a cent multiplied by millions, multiplied by 365 days a year, mean millions of dollars on the bottom line. Wal-Mart sold $244 billion of goods at retail last year. Each 1 percent of that is $2.4 billion.

Kevin Turner has learned Wal-Mart's business from the ground up, having started as a cashier back in 1985. He taught himself how to program, but he has always looked at IT from a user's rather than a developer's point of view. And user doesn't just mean "vp of analysis." He regularly visits stores and occasionally runs the register. "That's how I avoid getting a false sense of reality," he says.

Although he is now responsible for all of Sam's Club operations, he still has two big missions in IT: One is to move from handling exceptions to *avoiding* exceptions, and the second is to use RFID technology on a broad scale.

"We've grown from using IT to manage exceptions to using it to drive predictive simulations, so we can eliminate exceptions before they occur. If you can predict a trend, based on what's happening in society or with a particular item, you can have the right goods on hand: For example, we could start simulating Mother's Day in February. The characteristics of Mother's Day are very specific, similar to Valentine's Day, but not entirely. July Fourth is very different: It depends on the weather and is much more regional," he says.

"For the last 10 years, we've done a really nice job of organizing and collecting data. Predictive simulation is a self-healing process; each year we get better at it," he concludes. To do this, the systems need to cut across data in different slices; color, for example, extends across a variety of different goods and is expressed in different ways in women's clothing and in housewares or food packaging. Likewise, price points aren't absolute or consistent: When buying clothing for themselves in a price-conscious time, for example, people may simply buy a cheaper item, but when it comes to gifts they may switch from an "expensive" peignoir at $80 to "expensive" chocolates at $40.

Wal-Mart has the data to detect these currents and more. That sudden craving your kids have for a Fisher-Price Kasey the Kinderbot is, believe it or not, predictable.

Meanwhile, RFID promises a whole new level of visibility, granularity and timeliness, Turner says. Wal-Mart – at the time he was cio – was the first and only retailer in the founding group of the Auto-ID Center at MIT, the nonprofit standard-setter

for RFID. Turner is still involved. "We're excited about it; it's going to change everything," he says. "It's not new: TI had something, IBM had something. But now there's an open-standards consortium behind it, and we're talking cents, not dollars, for these silicon droplets."

The impact of RFID will indeed be huge. On the manufacturing and supply-chain side, people will know where things are and where they came from; they'll use RFID in sourcing, tracking defective products, tracking inventory, controlling spare parts and the like. Obviously, that will help Wal-Mart's and everyone's costs and quality control, but for Turner the real win is on the retail side.

"We'll get a lot better understanding of quality and raw materials, where they came from, and our own inventory management," he says. "From a consumer standpoint, it revolutionizes check-out. You pick out what you want, walk through some field, and walk out while your credit card is charged. Wherever you have to wait in line now, you won't have to wait anymore. And from the merchandiser's point of view, we'll know what we have and even more important, what we *don't* have."

COUNTERPOINT – Open Dialogue

Open source is often represented as a competitor to Microsoft, but it competes with Microsoft (and Oracle) in the way that the Liberty Alliance competes with Passport – by positing a different approach to the question. Open source's different approach is an attitude to the software development process as well as to business-model issues. The goal – if such a diverse movement can have a goal – is not to take Microsoft's place, but to erode its market power. Mitch Kapor and Tim O'Reilly are two of the movement's most articulate proponents. They aren't on opposing sides, but they aren't quite on the same side, either – which is the point about open source: It has many facets.

Mitch Kapor, Open Source Applications Foundation: Open eyes, open mind

You could say Mitch Kapor has a short attention span. Or you could say that he has a good sense of timing – arriving early and leaving when others are ready to carry on the work. Among the good and great works he has brought the industry are Lotus 1-2-3 (1982) and the Electronic Frontier Foundation (1990). Now it's Chandler, the forthcoming desktop productivity tool being developed by the Open Source Applications Foundation that he founded and funded last year.

Two things excite Kapor right now: One is the business model he's trying to prove out, and the other is the application itself.

"Many people assume we're some sort of for-profit entity on a hopeless mission. But we're not. We're a not-for-profit building a small application and an SDK that's open source, and the rest is up to the rest of the world. People can come and build on what we do; we invite them to."

The company has a paid staff of 10, including Mitchell Baker of mozilla.org fame, plus four full-time volunteers, including Andy Hertzfeld (Macintosh, Radius, General Magic and Eazel). Tim O'Reilly (below) sits on the board. "A relatively modest amount can fund our operations indefinitely; our budget is $2 to $2.5 million a year," says Kapor. He sees himself as the initial donor, but is looking for follow-on support from foundations and "people with a vested strategic interest, such as IBM. For example, I got an e-mail this morning from a traditional-style financial-services company. They've been using Python to manage and search across documents and e-mail. They said, 'Our project is shaky. Depending on the timeline, we could be interested in underwriting you. . . .' We want to drive some licensing revenue from people who want to take Chandler off in various directions. If we can be self-sustaining on a small budget, a ton of economic activity can be built around it."

As for Chandler itself, says Kapor with measured enthusiasm, "Things are going well. We're turning out real code. It's extremely modest, like a baby's first steps, but you can tell the baby's growing up."

He adds, "In the last couple of weeks, we've come up with some good design ideas. It's clear we can create some original products that add to the world rather than compete with what's already there. What kind of problem are we trying to solve? Basically, to integrate different types of information that are usually each managed in their own application: e-mail, task list, calendar, spreadsheet. . . . When people sit down to work and they get 100 e-mail messages, how do they manage their workflow? Right now, you can't just go to one place that has everything you need."

Chandler will address a different problem from what Oracle has tackled (storing everything in the same back-end database; see page 4). Chandler's mission is to integrate the different types of data at the client side, so that (for example) an appointment would move naturally from an e-mail into a calendar, and a check on an item in the calendar updates a to-do list that cuts across days, and that is organized by

project and cross-referenced into an employee directory. Chandler will also have agents that users can train to perform sequences of actions automatically.

This has shades of Lotus Agenda, an earlier product Kapor championed, but the world has changed: The underlying data structures and the user interface are much more tractable and interoperable than in those days. And, acknowledges Kapor, "We learned from all the mistakes of Agenda." He goes on: "Achieving this has something to do with outlines and something to do with tables and creating groups. I now have in my mind a much better mental model of what the apparatus has to be." Moreover, he'll get help. The working source code will be at the osafoundation.org Website in April, and all comers are invited to contribute.

"Pretty much everyone would like to have open-source alternatives, as long as they're high-quality. People do not like the absence of choice. But we're not trying to build a huge business. We want to keep the intimacy of a small development group. Everyone agrees it gets to be a lot less fun the bigger you get."

Tim O'Reilly, O'Reilly & Associates: Living what he writes

In addition to his role as a director of the Open Source Applications Foundation, Tim O'Reilly has a few other credentials in the open-source area: The notion of "free" software supported by paid-for services and ancillary materials is key to his own business model. His books, from *Running Linux* to *Programming Perl* to *Apache: The Definitive Guide*, are the bibles that developers and users rely on to master key open-source technologies. He organized the 1998 summit meeting at which the term "open source" was formally adopted, and was one of the leaders of the PR campaign to put the new term on the map.

"Where is the business model for open source going?" he asks. "Oddly enough, for much of the last five years, the media focus has been on open-source efforts – such as Red Hat's – to emulate the business model for proprietary packaged software, just as proprietary software is trying to switch to the model open source has had all along: software as a service. People are still trapped in the idea from the 80s that software is something you package up and sell." (That in itself was a novel idea after an era in which software was something that came with a machine or was written by the programmers who tended the machine. In the late 70s, Cray Research's price for its mainframe supercomputer included a dedicated human programmer for one year.)

"If you look at it this way," he adds, "the ISP business is the service side of the TCP/IP protocol stack and associated applications. There is also a service business associated with BIND [the open-source software that runs the DNS]: Network Solutions and other domain name registrars are generating hundreds of millions of dollars from it."

Warming to the theme, O'Reilly continues: "Apache shows another face of the 'software as service' business model. Apache was started by a group of users of the NCSA Web server after the NCSA developers went off to seek their fortunes with commercial Web software at Netscape and Microsoft. The users continued to evolve the code, sharing their patches (hence, 'a patchy server') so that they could continue to benefit from the use of that software. Sites like Yahoo!, Google, and Amazon, who rely on open-source software to deliver their services at lower cost and with greater control over their destiny, are the intellectual heirs of the Apache founders, even though the software they layer on top of it is not itself open-source."

So to O'Reilly, open source is much more than just a business model or a licensing philosophy. It's a reflection of how the Internet is changing the nature of software development by making it easier to enable wide-area collaboration. "Right now I'm fascinated by blogging. It has nothing to do with open source by the official definition, but everything to do with it in terms of the broader trends – peer-to-peer, relying on community feedback, sharing. . . . The Net is changing how people work and how people produce things. So I want to think about open source more deeply than just what kind of license you use."

"The Net hit the software development community first because that's where the most advanced users are. Some of the same trends will hit other communities. Now you have [The *San Jose Mercury News*'s] Dan Gillmor (among others) pointing out how blogging is creating a new kind of participatory journalism." It's also reflected in the trend to sampling in music, and has been around already in improvisational theater, story-telling circles and even quilting bees.

PRECLICK!: VISUALIZE YOURSELVES

While companies struggle to get value from their data, another, more insidious struggle is going on among consumers: how to manage the all their digital photos. Brian Smiga calls these unfortunate souls "the newly digital," and he founded **PRECLICK!** in September 2001 to solve their problem. Preclick's free photo-album software offers users basic photo-editing capability, with additional features , including tagging metadata to the jpeg file itself, in the paid version. Forum attendees will be invited to upload digital photos to a special Forum photo album, and write captions, too!

DINNER SPEECH – Models Come Alive

Will Wright, Maxis/Electronic Arts

"I could talk about community stuff in my sleep," says Will Wright. Best-known for *The Sims* (in all its many incarnations), he's an old hand at modeling communities, and at designing rules so that communities can build themselves. Modeling and simulations are the essence of Wright's life – from submolecular particles to living beings to cosmology. It's all just a matter of scale. As humans, we're best at comprehending things roughly our own size, but smaller and larger worlds beckon.

"So what would keep you awake?" we ask.

"Models for designers!" he says eagerly. "Imagine a 3D space. There are three axes: topologies, dynamics, and paradigms. These all represent the parameters of any interesting simulation."

According to Wright, topologies include agents, networks and layers – the internal structures of a system. Its dynamics include behaviors such as growth, propagation, specialization, allocation (of resources), clustering/groups and mapping/transformation – how things move and change.

And paradigms. . . . "What's interesting about paradigms is their evolution," says Wright, "how we've changed paradigms over time to reflect our current view of how the world works. It's important not to get religiously stuck in a single one."

"We began with cybernetics (control theory, analog electronics) last century," says Wright, "and then system dynamics – the refinery model of the world: flows and processes. In the 80s we get to cellular automata – biology, cheap computers – and chaos theory. Chaos theory was rather general. However, many of the visual tools it spawned made it easier to understand what was going on in complex systems, and to move from chaos to a more specific understanding of complex adaptive systems which had proven so difficult to formalize in the past. Now we're at network theory, which studies systems from a purely topological point of view and seems to apply well to that softest of systems – social structures."

What's intriguing to Wright is how you can take more or less the same raw materials – topologies and dynamics – and create such different worlds with different paradigms. How do the paradigms subtly influence the rules that run the worlds – and

the outcomes? Are the simulations getting "truer" as we move forward in the sequence of paradigms?

Wright himself has made the same transition across paradigms over time. Beginning with ship and airplane models and then moving on to robots as a kid, he built *SimCity* in 1989, as a hybrid straddling system dynamics and cellular automata. By 1999, he had designed *SimAnt*, with a clear biological bent. Meanwhile, the relatively mechanistic *SimCity* had led to the Sims themselves, complex simulated people compared to the relatively simple agent-people of *SimCity*. The Sims have become increasingly sophisticated, going to parties and on vacation, among other things.

Of course, Wright acknowledges, paradigms overlap, and they interact with topologies and dynamics to reflect our notions of how things work.

"Network theory is very elegant in terms of describing social systems," says Wright. "You can make a simulation of how users would meet and form groups in *Sims Online*. There's a spring tension between the nodes. Once players play together, they tend to recongregate when they have the chance and form clusters. For example, you may have five close friends, but you also have casual acquaintances. They glue the clusters together so that you can have a society. If you didn't have those loose connections, you'd have a very fractured system." (SEE ALSO CLAY SHIRKY'S SHOWCASE PANEL ON SOCIAL SOFTWARE, PAGE 81.)

Ant colonies: Regime change

Information flow, both local and global, is an important dynamic that underlies all the paradigms, says Wright. Currently, it's a mechanism for social networks: "In ant colonies, for example, they drop these trails everywhere, which determine local behavior – where they forage for food. But they also have a global communication system, also based on food in a way. . . . Each ant has a social stomach and private stomach. They digest in the private stomach, but the social stomach holds food for sharing. They're always regurgitating food and sharing. If you put a tracer chemical in one ant [by feeding it a marked substance], within five hours, it will be in virtually every ant in the colony. If the queen dies, the chemical that she produces evaporates pretty quickly, and by its absence they know that the queen is dead. Then they do whatever their particular subspecies does to create a new queen."

Would that it were so simple in human society!

TUESDAY, MARCH 25

Today we talk about data in the context of business models: for content, for software, for communications, and for Google.

PANEL – Content in Context

It used to be you could own an audience; now all you can do is rent one, and the rents are getting higher all the time. The content business divides somewhat fuzzily into two models: user-paid content and related services, and advertiser-supported content. Even as Yahoo! and AOL strive to differentiate themselves and their business models, they seem to be converging from different directions. Both companies are working hard to define packages of services that are compelling, with enough variety and choice to excite customers but not so many options as to be confusing.

That comes down to a marketing rather than a content question: What do users want? And how can content services provide it in a way that leverages their knowledge of each customer without intruding on the individuals' privacy? Also, each company needs to consider what tools and resources users want to create and manipulate content – their own and others'. That raises the issue of copyright. But whether it's a pricing or a moral issue, copyright is not likely to be "resolved" soon. Balancing price and accessibility will continue to be necessary. Meanwhile, new offerings such as broadband are interesting only if Yahoo! and AOL can turn them into more than a commodity.

In short, market success won't depend on some magic bullet, as Yahoo!'s Dan Rosensweig notes, but on implementation. The content business is a little like the restaurant business: Fashions change, and the purveyor needs to keep up with fickle consumer tastes. . .but the underlying operation needs to be well-managed and deliver something solid. Add to that mix a challenge restaurants don't face: The need to generate advertising/marketing-partner revenues in a way that adds to rather than detracts from the experience.

*By contrast, CNET and Google (*SEE PAGE 55*) both concentrate on the content, putting it, rather than the user, at the center of things. CNET enhances its journalism with a rich underlying database of structured product information, and enhances the value of its database with news and point of view. Meanwhile, Google simply does a powerful job of finding the right content and matching it to advertising without knowledge of the user, for better or worse.*

Shelby Bonnie, CNET Networks: Structure adds value

Shelby Bonnie was a managing director at hedge fund Tiger Management in New York back in 1992 when he started working on the business plan for what became CNET with founder Halsey Minor. He invested personally and joined the management the following year. Now ceo and chairman, he has turned it from a computer-industry publisher into the leading computer-oriented news source, outlasting and buying out much of his erstwhile competition. CNET Networks now has 55 million unique users and is one of the top 15 global sites. It has about 1,700 employees worldwide, including 250 each in the fast-growing Chinese and Russian markets.

Perhaps it's Bonnie's quantitative bent as a former fund manager, but CNET has long had a solid set of data underpinning its editorial coverage and its marketing products. (SEE **RELEASE 1.0**, JANUARY 2003.) On the content-production side, the company has about 300 people who focus on classic journalism such as news and reviews, and a somewhat larger number who focus on the underlying data. The data includes everything from product specs and configurations, to a well-architected database of downloadable software that is easy to navigate for users searching for specific functionality, whether programming tools or games.

"When you look at why CNET did well versus, say, *PC Magazine*," he says, "it's because we produce useful products built on data. Reviews are means to an end; the reader is usually interested in buying something and also needs specific information to make a purchase. He wants to see a table, to compare similar products, see pricing and availability. It gets much closer to a tool than a set of paragraphs, and that's where we win. We seamlessly marry data and journalism."

Of Yahoo! and AOL Bonnie says: "They're broad-based portals, at the highest level of generality. We take one vertical and do it deeply. We're a content-producer and they are aggregators. We certainly compete directly for ads, but there's a role for both approaches, just as there's a role for *Time* [and *Newsweek*] and for *PC Magazine*. Of course, producing our own content is an added cost, but it's also a barrier. There's so little friction to stop people from moving, so the only way to keep them is with something that's better."

In addition to his role at CNET, Bonnie is chairman of the Interactive Advertising Bureau, and cares about the subject intensely. "Advertisers buy against verticals; it's very rare to buy just general run of network. I like being in verticals. Verticals are much more natural in creating reader interest and leveraging context. In print or on television [before TiVo, anyway], people just accepted ads as a necessary annoyance.

The epitome is the popup model: 'You're going to use my content and I get to annoy you.' It doesn't work the same way on the Web. We have in the past run a few on Gamespot, but not on CNET, the news or other products." In other words, he doesn't see it as a moral issue, but as a pragmatic decision.

"It just works better if you treat advertising as contextually relevant information from a marketer. That's not just fancy words: If you embed information about Dell in a buyer's guide, it's useful to the customer and to Dell, too. Google's adwords are another great example: the user picks the content and gets ads relevant to that content. By contrast, there's nothing more annoying than an ad for personals while you're looking for CRM information."

Beyond the consumer market, CNET is building on its strong presence in the computer business market. It both contributes to and benefits from the increasing commoditization of the market; high-margin distribution systems are eroding as resellers and customers are able to compare and acquire products for themselves online. VARs who genuinely add value through customization and other services can add that value to low-cost platforms, while resellers who simply tack on margins are finding a better informed marketplace tough going. Thanks, CNET!

Jonathan Miller, America Online: Your place in cyberspace

Jonathan Miller joined AOL just seven months ago, with a mission to reorient a business that had lost its way. Over the past few years, the service that had begun by delivering value to users, was now delivering users to advertisers. Consumers had joined to be able to reach one another – through chat rooms and instant messaging, primarily – and to get some content, but the focus changed as AOL got caught up in the quest for advertising revenues and marketing deals based on faulty economics. Consumers complained about the proliferation of pop-up ads and weren't entirely assuaged when AOL stopped selling them to advertisers but continued using them for its own properties.

After a few months orienting himself, Miller has now begun to lay the groundwork for broad changes: "AOL has not invested in the product for some time. We'll be rolling out innovations and investment that are bigger by an order of magnitude than before." His plan is to build on AOL's strengths rather than manufacture a strategy from a vacuum. Those three strengths, he says, are the company's existing subscriber base, its access to the entire range of AOL/Time-Warner content and its network infrastructure.

First, he's looking at the business of managing online subscriber relationships with consumers. "It was just one thing: dial-up, $23.90. Now we'll have a range of price points and services, including different sets of content, messaging services and the like. It's very much going to a paid-content model. We're the biggest buyer of content so the economics will be best for us. On the other hand, if you're an ISP just offering access to blogs for $9.95, then don't spend one red cent on content!"

Miller acknowledges that free content won't go away, but he doesn't need his customers to pay for everything; they just need to be willing to spring for $20 to $30 per month for access to content they can't get elsewhere. "Feel free to ask!" he says. "There is an answer to the question of what new kinds of content and services we'll offer."

For those who still don't find paid content compelling, AOL has another angle, this one de facto more focused on the broadband market. "There are definitely different behavior patterns in how people use the Net," says Miller. "The most relevant factor is time online, but it also correlates with the use of broadband. Experienced users do more self-expression, more shopping; they come to rely on the Internet for their news, instead of newspapers. And they tend to be more willing to trade up to broadband. I think the key factor for broadband is always-on rather than speed. . . ."

"But we want to go beyond that to mobility: always-with-you. We have this huge back-end host infrastructure that no one else has. It allows you as a user to do things like store all your stuff there. We can handle the storage and make it available to you anywhere – on the road, on WiFi, on a mobile phone or a PDA. That stuff can go into the cloud and you can share it with friends or family – whether it's blogs or photos or [uncopryighted] music. We can hold your address book or your files so you can get them whenever you need them, on whatever device you prefer."

Warming to the point, he continues: "We offer a thousand times more storage per person than MSN offers, and MSN makes you pay more. Yahoo! offers even less!"

And finally, AOL, because it can be always-on, is an ideal medium for presence management. You could extend that to managing personal identity, including personal spam filters and access controls. Notes Miller in amazement: "Yesterday we blocked 1 billion pieces of spam! No one else operates at that level."

Dan Rosensweig, Yahoo!: The funnel philosophy

"A lot of your strategy has to depend on your roots as a company, your mission, your financial goals and your competitive advantages," says Dan Rosensweig, coo of Yahoo! "AOL has to protect a fee that's losing value. . .whereas we are solely focused on creating Internet-centric products and services that provide value to both individuals and businesses. We're not a creator of offline and online content like AOL."

He goes on: "Content providers hope there's a magic bullet – the one product or service that everyone will pay for. Is it video-based content, clips of things you can already see somewhere else? Or is there no single magic bullet, but rather a mix of communication, entertainment and Web-based content products, as we think? We're focused on products and services that relate to what people want to do on the Web every day - services like mail, communications and search – and added-value products and services, such as tools for protecting against spam or viruses."

Like Miller, Rosensweig joined his company recently, just 11 months ago, and has a lot to fix. "I was one of the biggest complainers about Yahoo! It had gone through a period of 'Do anything you can to bail out the boat,' in the tough climate of a couple of years ago. It was the right thinking at the time. But now that time is over, and we're going back to the old philosophy, of being customer-centric and innovative. We're focusing not just on revenue, but on total product quality. The quality of free products and services is as important as the quality of those for which we charge a fee, as it's the free services that introduce users to the Yahoo! experience."

He continues: "In one sense, we're luckier than AOL. Not cleverer, but luckier. AOL owned its customers, because that was the only way to get access. But now, because we weren't protected before, we're stronger. We've learned how to create value with [ceo] Terry Semel's funnel philosophy, from free to registered to paid. For the first time, we're ahead of Hotmail in number of users; we've made up a gap of 4 million users [vs. Hotmail] since we improved our mail in August. It was growing at 4 percent year-over-year last year; now it's growing at 13 percent. Customers are making Yahoo! their primary mail, and that leads to [paid service] Yahoo!-Plus, which is also going through the roof. You don't have to pay just to keep what you have, but you pay to get extra value."

The overall quality approach, he says, is to make the Yahoo! interface cleaner, less cluttered, and faster and easier to use: "We put the most-used tools above the fold, so we don't confuse or bore people. We've not only integrated all the functions such as address book calendar [Chandler for Yahoo!?], but also content. You can get a bas-

ketball team's schedule via e-mail, and just put it straight into your calendar. The percentage of [our registered] users using the address book went up 20 points."

A case in point is what the company has done with HotJobs, acquired last year and in a business that Rosensweig calls "tailor-made for the Web: You create a fertile marketplace of job seekers, employers and even agents who are now using the natural marketplace of the Web to make their search and placements more efficient and relevant. Since we bought and integrated it, it's been growing, in a declining job market. In fact, more than 70 percent of all new applicants on HotJobs found it through Yahoo!"

What really matters to employers, though, is the ability to find both active and passive job-seekers, says Rosensweig. "We have people who give us information about their jobs, and they check, 'We're happy to hear from people about our careers.' So employers know we have more than just the active seekers in a down market. They get the benefit of the entire Yahoo! network in addition to HotJobs. Monster did a lot of big development deals like what AOL did, but it didn't cultivate great relationships with employers and individuals. We have been the beneficiary of that." He waxes enthusiastic: "We have more registered nurses than you can shake a stick at, more carpenters, more paralegals. . .!"

"We're building more things along those lines – personals, travel," he says. "We want to bring the user what they expect to find, based on who they are. Google is a great search tool, but at the end of the day, Google knows very little about you – just algorithms about the content."

PANEL - Business Models and the Enterprise

*What do enterprises really want from their IT vendors? Like unfulfilled partners everywhere, they probably want more from the relationship than the IT vendors can give. Nonetheless, though IT can't provide happiness, it can help companies deal with their practical problems, most of which center around getting a better handle on current operations. That doesn't mean no new projects; it simply means that the projects usually focus on adding value to existing systems rather than launching new ones. The watchwords are integration and efficiency rather than innovation and leading-edge. Even - or especially - in Web services (*SEE PAGE 44*), the technology is used more to leverage legacy systems than to roll out entirely new functionality.*

As our speakers below explain eloquently, all companies – large and small – want to leverage economies of scale, and they want the different units and functions of their businesses to communicate more intelligently. The approaches are all different: IBM Business Consulting Services promises integration, while SAP offers a seamless platform. Salesforce.com suggests CRM together with customer data as a unifying, outsourced integration hub to connect with other systems, while Interland offers smaller companies the ability to outsource almost everything, and to use Interland as their gateway through the Web to their customers and partners. But the goal is the same: more meaning and more actionability from their data.

INTERVIEW - Ginni Rometty, IBM: Efficient and agile

To Ginni Rometty, the two big challenges facing her clients at IBM's Business Consulting Services are agility and efficiency. "We have talked about on-demand business," she says, "This is not a hammer looking for a nail; it's a direct response to what people are asking for. There's a whole new requirement for efficiency, for cost-effectiveness. Clients say they need to have huge reductions in SG&A, to reduce close times on their financials. No matter what size you are, it's a scale game. Few people can acquire enough to be the largest [except for IBM, which folded the erstwhile PricewaterhouseCoopers Consulting into Rometty's division]. But they can buy into someone else's scale. Scale isn't the only way, but it's behind a lot of current trends: offshore back offices, global sourcing, shared services. . .and eventually, a huge demand around process outsourcing, not just IT outsourcing."

She continues: "Second, everyone is struggling to be agile. . .to create systems and processes that are responsive so that if a domino falls, it hits all the rest of them, and something happens. The point is that you need systems cutting horizontally across your business; what happens here has to have an impact there. You put in RFID everywhere, so if the truck gets in a traffic jam, you'll know it will be late, and your product won't be on the shelves, so you can put out a replacement. The enterprise can respond to variables anywhere in the business. Agility really plays into the Forum's theme of data. The trick is getting value out of existing infrastructure." And IBM's Business Consulting Services, because it is not focused on selling specific products, is well-positioned to integrate whatever clients already have.

"Clients have already done the low-hanging fruit, automating most operations," she says. But now they need to connect them. She cites one favorite example, IBM customer Wellchoice (formerly Empire Blue Cross/Blue Shield) in New York state, which is developing a new customer-claim system. "It's utility-like and large-scale,

but it is also agile: The system is linked to disease management. When a claim comes in, you not only process the claim but you also analyze the data from a disease-management standpoint and get the person into the right treatment right away." On the efficiency side, she notes, the project is paying for itself in cost-savings, including the use of offshore development resources.

Rometty comes to her role after a long career at IBM, which she joined from General Motors. In the early 90s, she helped launch IBM's consulting services group, and led its efforts in financial services and insurance. Most recently, she has overseen the acquisition and integration of PwCC into IBM, which requires both agility and an ability to handle scale!

Marc Benioff, Salesforce.com: The platform is the message

Marc Benioff agrees that customers are more risk-averse than ever. . .but he proposes a different solution from Rometty. Rather than try to integrate across their own different environments, he suggests, customers should simply leave the driving (and the hosting) to Salesforce.com.

"Enterprise technologies are inherently risky, costly, slow to implement. . .they don't fit into today's consciousness," he says. Salesforce.com delivers on the scale front: You can buy by the sip. And it's not so bad on agility either: Although Benioff touts "the end of software as we know it," underneath it all the company has built a modern, modular CRM system that hooks neatly into a variety of ambient systems, including SAP, Oracle, SQL Server and Siebel as well as components such as XML, SOAP, document management and custom applications. Sure, it's customer- and salesforce-centric, but that's not a bad place to start. Any company's salesforce is a key community that should have access to and be able to send data to all the other parts – production, supply chain, support, finance and the like.

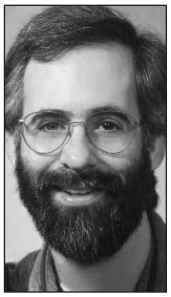
Benioff cites a variety of customer setups where Salesforce.com mediates between other services for a customer: Segway uses it between its Amazon.com sales microsite and Oracle Financials (using XML). Putnam Lovell uses it to manage creation and distribution of research material through the Blue Matrix financial publishing service, back-ending onto (again) Oracle Financials. Alcatel uses it between Genesys call centers (for performance support and call-management) and SAP. And EFI uses it to give its salesforce SMS access by cell phone to its SAP back-end. This is what at least one part of Web services is really about: You may think Salesforce.com is a hosted

application, but John Hagel might call it part of the service grid. (SEE PAGE 44 AND **RELEASE 1.0**, DECEMBER 2002.)

"It's a cool place to be because more than 50 percent of CRM roll-outs have failed," Benioff asserts cheerfully. "We just signed a contract with AOL; they already own Siebel, but they're still going with us. Ask them!"

Benioff himself still affects a "bad-boy" style that some may think went out with the last century. But it surely still appeals to many a cio, especially to cios afraid of making long-term commitments and of being pushed around by their vendors. You can buy Salesforce.com's services by the month, though there's a discount for a yearly contract. The basic appeal is to leave the drudgework to Salesorce.com and to benefit from economies of scale in administration as well as R&D. Benioff goes through an elaborate pitch explaining the concept of software as utility – including the notion that owning software is like owning your own outhouse, full of bacteria. . .why not benefit from the municipal sanitation plant?

Dan Bricklin, Interland/Trellix: VisiBiz



Dan Bricklin is cto of Interland, the company that just purchased Trellix, which he founded in 1995 and has led technically since. Best-known as the co-creator of VisiCalc, Bricklin learned about the importance of prototyping and visualization from his father, a commercial printer. In those days before computers, Bricklin recalls, "He would mock things up, cut actual pages of paper, paste the pieces together and then photocopy them onto a single clean page to show the client what it would look like before setting it all in type."

When Bricklin junior later developed the idea for VisiCalc at Software Arts, he recalls, "I prototyped it in BASIC. No one understood the program until I showed them. I showed it to Bob [Frankston] to be programmed in Assembler, and I showed it to potential users to get them to want it." After some time with Lotus, he produced a prototyping program for non-programmers called Demo. That was for DOS machines (remember?). A whole lot later, he came out with Demo-it for Windows and eventually helped lead the development at Trellix of Trellis, a successor Web-authoring tool which is now used by Tripod, CNET and iVillage as a standard tool for their user-members. It ended up on more than a million personal Websites, many of which were small businesses.

"Another customer, Interland, decided this whole authoring thing should be integrated with the hosting," says Bricklin. "Not just the HTML coding, but all the stuff behind it: catalogue manager, e-mail marketing, site statistics, all those pieces. That's where things were going, especially if you were going after the mass market of small businesses as Interland is. They purchased us to learn that. They're a hosting company with infrastructure software rather than marketing software."

Although Interland's customers are small, they have the same needs for agility and efficiency that Rometty outlines above. They just have fewer resources.

"Everything Amazon does, small business will be expected to do, too," says Bricklin. "With one exception: There are lots of businesses, big and small, that don't take credit cards or ship by FedEx. They still need to communicate with their customers, outline their services, be responsive. But you can't change a small company's back-office – which may be the owner's personal Day-Timer and a shoebox of invoices and checks.

"Yet the customer may expect an e-mail from the shoemaker to say his shoes are ready. We can offer computers running on your behalf, waiting to handle your communications. We're going to provide that stuff, even if you're a plumber. Our hosting is a gateway to other services: an e-mail address, a link to an active form, warranty information or a FAQ on how to fix something."

And, notes Bricklin, it's also a link to other Web services, technical and commercial: "What's really exciting about Web services is that it exposes a lot of facilities for our customers to use. Websites like eBay, Google, Amazon, FedEx. . .they all have APIs, mostly using http and XML. We're starting to build systems to help our users integrate with those sites on behalf of their customers."

And, of course, using SMBmeta (SEE **RELEASE 1.0**, JANUARY 2003), Interland is helping them to do a better job of showing up in search engines and directories. SMBmeta is a standard for an extra XML file on each Website that clearly lays out its basic business particulars: products/services, opening hours, location(s) and the like, so that any business can easily be found by potential customers. And, notes Bricklin, "It's so much cheaper to publish online: A year of hosting costs less than one professional photo for your brochure."

Bill McDermott, SAP America: A salesman in sync with his mission

Bill McDermott is part of the trend he sees: a flight to quality and stability that favors large companies such as SAP. After two years at Siebel and a brief year at Gartner, he joined SAP to run its North American operations last September. Before that, he had worked at Xerox for 17 years, rising rapidly through the ranks to lead a $4.5-billion global business at the age of 37. "I changed careers because I didn't want to wait to be ceo at 45," he says. "It was time to bring my vision forward."

"I was attracted to SAP for the same reasons our customers are: It's a substantial global company with a great deal of integrity and unquestionable character," he continues. "Customers want a stable, proven solutions provider. Today's world, driven by the current geopolitical and global environment, is risk-averse. Customers are not going out of their way to make any risky moves or bets. Much more scrutiny is placed on getting dollars to spend initially, and even more if those dollars don't get a return."

SAP is the world's largest enterprise application software company – with more than 19,000 customers and 60,000 installations in 120 countries. This, combined with its $1-billion-plus annual R&D budget, resonates in today's environment. "Customers are turning to a 'trusted advisor'," says McDermott. "Having thousands of referenceable success stories across multiple industries is critical to gaining market share."

But where IBM promotes the ability to integrate across diverse environments, SAP suggests that integration is most real when you're running the same software everywhere. Nonetheless, SAP realizes full well that not all customers will run an SAP-only system – so, just like IBM, SAP promotes its technology as a platform for integrating diverse environments, too. But, McDermott adds, "In the past, customers might have picked a best-of-breed or a particular application, but now they better understand the true costs of integration. Customers want to cut down on the number of suppliers and especially 'innovators.' Customers are not sure these companies will be viable over the long term, and they've seen that they are less successful on implementation and support. They are realizing they have to run the core operations of their business and they want a partnership with someone who can do that."

This all comes along with a transformation at SAP itself to become more customer-friendly, as Forum attendees heard last year from co-ceo Henning Kagermann. "We're making the transition from a great engineering and products company to a customer-focused market leader," says McDermott.

McDermott knows his sales numbers the way techies know their protocols. "The resurgence of the US market for SAP is our story. Our US competitors get 50 percent of their revenues in the US," he says, referring to Oracle. "It's 70 percent for Siebel and PeopleSoft. When the US market improves, we'll gain market share here. In the fourth quarter of last year, we overtook Siebel to be number-one in CRM," he notes with satisfaction. "We have the momentum, but our work is not finished."

In his scant six months at SAP, McDermott has already made significant changes. He says, "We're building a great team. We have an audacious vision and we have a clear mission: to be the number-one provider of enterprise application software in North America and grow at one-and-a-half times the market rate. There is more accountability in our business than ever before. Know your customers, know your industry, be realistic. I expect employees to have a trusted partnership with each individual customer. We're going to do a much better job than we have in the past of cross-selling within existing accounts, which takes share away from the competition."

PANEL - Web Services Get Serious

John Hagel: Hagel's theorems

John Hagel, formerly a partner at McKinsey, has written three popular business books, Net Gain *about online communities,* Net Worth *about infomediaries, and* Out of the Box *about Web services.* Out of the Box *is getting a lot of traction, he says, especially among companies distributing it to employees or business partners with the subtle or not so subtle message that the technology is worthy of a book, not just a product brochure.*

Hagel himself is helping them to tap into the technology, working as a consultant to a variety of enterprise clients he won't name. But in his spare time, when he's thinking – or writing the December 2002 issue of ***Release 1.0*** *– he's most excited by the next step beyond Web services: what he calls "service grids." As he outlined for us in December, the idea is that while Web services enable companies to connect technically, once they go outside their own corporate walls they also need a way to connect semantically and commercially. Who sets the terms of engagement? Who monitors and assumes responsibility for quality, performance and other metrics? Who defines the vocabularies, allocates resources and resolves disputes?*

Says Hagel: "The rise of Web services offers opportunities for service-grid middlemen, offering everything from taxonomy translation to quality-of-service management and

reputation systems. My big interest now is spending more time thinking through what it means to have loosely coupled businesses along with loosely coupled technology. The service grid is how you deliver on the dynamism and openness of that loose coupling and still deliver on service promises, too."

This new concept is gaining ground, says Hagel. "CommerceOne and e2Open are explicitly making a point of it, and Grand Central [a company he helped to launch] has been evangelizing it for some time. A number of companies are edging their way towards the service grid without calling it that. I met with about 20 cios from large enterprises recently, and I thought I'd have a hard time, but they latched onto it. If customers start asking for it and pushing for it, you can bet the providers will show up!"

Web services get serious

BY JOHN HAGEL

We've heard it all. Web services will free us from the shackles of proprietary technology. Web services will enable dynamic composition of applications on demand. Web services will dissolve the boundaries of the enterprise. Web services will cure world hunger. For any new generation of technology, the best way to sort through the hype and understand the real capabilities is to talk to users, especially early adopters. This is certainly true for Web services.

Given the early stage of development of the technology and the generally poor state of the economy (not to mention tech spending), the breadth and pace of adoption is actually quite surprising. In fact, companies in many industries are embracing Web services, including such mainline manufacturing industries as automobiles and chemicals. And they're not just experimenting with the technology. They are deploying it in production environments and generating real business value.

What can we learn from these early experiences? First, that there is a real need to balance targeted business-driven initiatives with broader architectural initiatives designed to harness long-term value. If companies focus too much on one-off business-driven initiatives, they may reap near-term value, but make it harder to exploit the flexibility and longer-term economics of service-oriented architectures. If they focus solely on the design of robust service-oriented architectures, they will end up with some impressive drawings, but little near-term business value or essential skills that come from production-environment deployments.

The second lesson is one we have learned many times before, but often forget. Technology is not everything. Organizational and cultural issues can make or break a Web services deployment. Skills are a big issue, but the most significant potential obstacles are far more subtle. Shared meaning is a big one. Does everyone mean the same thing when they use the same terms? Incentive structures and identity systems are even more challenging. Web services facilitate sharing of resources, which raises thorny questions: Sharing with whom? How will the resource owner be rewarded for sharing? These issues are all challenging enough within a single enterprise. They become a real hornet's nest when Web services deployments span multiple enterprises.

The third lesson is that the near-term benefit of the technology comes from better access to data. It's not about developing impressive new applications. It's about mundane plumbing – getting data from one system to another cheaply and flexibly.

Companies can realize that benefit in two ways: reducing costs or increasing value. A lot of operating expense and asset investments today are associated with inefficient information access: Swivel-chair integration, for example, can really eat into an operating budget. So, there's an opportunity for significant operating savings (above and beyond the IT savings themselves). The other option is to focus on creating more value, either by offering enhanced information to customers or enabling key decision-makers in the enterprise to make better decisions.

Jerry Hale, Eastman Chemical: Better living through Web services

Jerry Hale, vp and cio of Eastman Chemical, takes a broad view of technology: "If you haven't thought through the architecture and made sure the foundational elements are in place, it's going to be very hard to harness the power of any new technology." Eastman Chemical is a $5-billion global chemical company based in Kingsport, Tennessee. It dates back to 1920, but over the past five years Hale has led a major overhaul with the goal of standardizing the entire company on a common set of applications and infrastructure.

As part of this effort, Eastman Chemical implemented a robust data warehouse, as well as standard ERP, manufacturing execution and e-commerce systems serving the entire company. Hale now points to these systems as the foundation enabling deployment of Web services within Eastman Chemical. "If we hadn't already made that effort, we would be facing real challenges in ensuring that we had a common vocabulary throughout the company. We're lucky – that's one less obstacle that we face as we deploy the technology and it will allow us to move more quickly."

Even so, Hale suggests that the common business language evolved within Eastman Chemical is too low-level in detail to be helpful in addressing the needs of senior management, business partners and customers. "We've got to raise it up a notch to make it more meaningful for them," Hale comments.

The development of a management scorecard system, integrating corporate, industry and macro-economic data, represents Eastman Chemical's most significant deployment of Web services to date. "We couldn't have done it without Web services," Hale observes. "Our ceo has been looking for this for years, but the cost and complexity would have been prohibitive without this technology." The precise business benefits are difficult to calculate, but Hale indicates that the senior management team is convinced that the investment more than paid for itself.

Hale suggests that this is a good example of where the technology can yield value most quickly, given its current state of development. "The early action for us is in 'read only' implementations, where no posting or updating is required. Web services give us very attractive publish/subscribe capabilities."

Hale is convinced that "Web services has the potential to be a revolutionary technology, especially in enabling a service-oriented architecture. The power will come when we can extend that architecture across multiple enterprises – but that's also where the greatest challenges are."

Right now, Hale is focused on more near-term needs, some technological and some organizational. "We have a high-performing IT department, but we are woefully short on the skills required by this new technology." Hale points to technology vendors and says that they need to help fill this gap in the near term. "They have to be prepared to provide us with the necessary consulting and training help, and they would be well-advised to include at least some of this help in the license fee, rather than trying to boost revenue with all these add-on fees." Hale also urges the major application and platform vendors to move faster to expose the functionality of their products with Web services.

Tony Scott, General Motors: Industrial-strength Web services

Tony Scott, cto of Information Systems and Service, the corporate IT Group at General Motors, says Web services are being deployed broadly within the company. "We have at least 25 active deployments of this technology. They're not 'bet the company' deployments by any means, but they are in production environments deliver-

ing real business value. There's no real pattern: We're finding uses for it in many different parts of the business and in many different application environments."

Scott notes that Web services deployments are occurring even in GM's factories, the most conservative part of the business. As at Eastman Chemical, the function in the factories is data access rather than anything that directly manages data: "It's certainly not common in the core manufacturing operations yet, but we're using the technology in some manufacturing activities like quality and inventory analysis. We're geting better access to the data generated by the legacy systems running our operations."

Scott notes that Web services technology is still at an early stage of development, and many issues could slow broader adoption. Security is one of them, but Scott puts a different twist on it: "Everyone knows that Web services technology needs a lot more robust security functionality, and lots of vendors are working on this. One of my concerns is that the strength of Web services technology may also be its vulnerability. As ubiquitous standards get deployed, we may lose one of our best security defenses. Today, many companies achieve security by obfuscation. Diversity is a very practical key defense mechanism, just like in genetic systems. What happens if we all move to a common set of standards and protocols to manage our systems? If there's a security hole, it can become very big very rapidly. Look at what Slammer did to us. It just raises the bar in terms of making sure that we have very high security functionality."

Like Hale, Scott focuses on the importance of shared meaning, through well-understood data models and shared data architectures, as a key gating factor in the adoption of Web services. "If you don't have that in place, it is likely to take some time to build the necessary shared meaning," he says. The automotive industry is well placed to implement Web services with business partners, he adds. Through industry organizations such as the Automotive Industry Action Group, automobile companies have invested considerable effort to develop shared meaning with earlier implementations of electronic interaction.

At the end of the day, Scott sees reusability as the most significant value of Web services. "We've discovered the importance of parts re-use in our cars; Web services offers us that same potential in our IT platforms. For example, if we wanted to change the business logic associated with vehicle identification numbers, that would have required hundreds of changes in individual programs in the old days. With Web services, we have the opportunity to centralize the change to one business rule that is shared by all the applications that need it."

Scott recognizes that organizational issues become one of the biggest obstacles to reusability. "Incentives and rewards are a big issue, especially as the re-use extends across organizational boundaries. Intellectual property is another big issue. We have only begun to think through some of these challenges. This is not just an IT issue, by the way. It will ultimately force a dialogue throughout our business to redefine how we do things from a business process viewpoint. At the most basic level, it will call into question how we make and sell cars."

John McKinley: Web services save money!

John McKinley is not easily impressed. As cto of Merrill Lynch for the past five years (he resigned from this position at the end of February) and as cto of GE Capital for three years before that (not to mention many more years in other technology-related positions), McKinley has seen a lot of technology and has a well-developed ear for hype. He has certainly heard a lot of hype about Web services, but he has also seen it in action - enough to become a champion of the technology. McKinley predicts, "Web services will become so pervasive that it will ultimately become the lingua franca of computing. I don't mean just at the application layer either: It will pervade all elements of our IT infrastructure, including network architecture."

Last year, McKinley organized a Web services boot camp for Merril's top-100 IT executives. The message went out: "If you have a major IT initiative, we assume it will be deployed with Web services. If not, the initiative sponsor had better be prepared to answer the question 'why not Web services technology?' The burden of proof will be on the sponsor to justify any alternative technology."

Merrill has focused on exposing its major legacy mainframe systems as SOAP services. McKinley says, "We're making our legacy systems accessible to current-generation programmers who don't understand the intricacies of older technologies like CICS and COBOL"– thereby making their functionality available to users, too.

He adds, "As we can expose more value-added services and make them securely available to our clients, we have an opportunity to increase our differentiation and embed ourselves more seamlessly into the systems and operations of our clients."

There are financial pay-offs as well. McKinley cites the example of a recent effort to implement security services in Merrill's institutional marketplace business. "Using the best alternative technologies, this initiative costed out at $800,000. Using Web services we were able to deliver the functionality for $30,000."

In the near term, McKinley believes productivity and quality benefits will drive the adoption of Web services. "Ten cents of every development dollar actually goes to high-value-add activities; 90 cents goes to mundane lower-level activities like regression testing. Web services technology can help free up our application development teams to concentrate on adding more functionality to our applications."

Merrill currently has over 50 Web services implementations in production environments ranging throughout the business. The largest implementation today is a new Web services-based Wealth Management Workstation (developed in collaboration with The Thompson Corporation) serving more than 28,000 users, including financial advisors, client associates, the Financial Advisory Center and call centers.

PANEL - Loosening the Tethers: Users Go Mobile

One man's woe is another man's WiFi. Telecom may be a devastated sector, but the flip side of that devastation is a profusion of cheap services and new applications to take advantage of them.

Convergence is everywhere. One form is convergence between local and worldwide: Users and their devices want to be connected seamlessly regardless of where they are or how fast they're moving. And they don't want to deal with the complexities of roaming, different devices or cross-carrier incompatibility. They want a single phone number when they move – either with their cell phone or with their VoIP phone. Can the industry satisfy them and make a profit doing so, even as competitors/resellers such as Vonage and Cometa use network capacity more efficiently than incumbents?

There's business-model convergence too: between the Internet platform, with its openness and standards, and the current telephony marketplace, where so much depends on the operators, who in turn depend on the regulators. The Net's infiltration of telephony fosters vendors such as Action Engine and MetraTech (PAGES 68 AND 76), as well as the members of this panel. Increasingly, launching a new service or application no longer requires the blessing of an incumbent operator; you simply find your place in the ecosystem and look for customers.

And finally, there's a battle over who owns the customers: Right now, Critical Path sells solutions both to network operators and to enterprises, but if the company becomes too successful it is likely to have to make a choice and join up with one side or the other.

Larry Brilliant, Cometa: MidWiFi to a giant

Larry Brilliant has had an eclectic career – not over yet! – that leaves him well-prepared to launch a baby giant such as Cometa Networks, a start-up WiFi service integrator. The company is the joint offspring of Intel, IBM and AT&T, and it's garnering the kind of attention that was lavished on 20-person companies two years ago. It has received press coverage that rivals Brilliant's own, as a medical doctor devoted to eradicating smallpox and fighting blindness in developing countries, as well as former personal physician to Jerry Garcia of the Grateful Dead. He has also founded a number of IT start-ups including the WELL and more recently SoftNet Systems, a one-time WiFi company which has since been sold to an insurance company. But now, he says, "You can't anymore make the mistake I've made so many times, and sip your own whiskey and be ahead of the demand curve. Don't build before they come." But this time they do seem to be coming, as shown by the demand Intel sees for WiFi equipment and by the PC Forum audience, among other indicators.

He got involved in Cometa Networks as a consultant to Intel Capital, and was persuaded to become interim ceo just before the company's official launch last November. (The new ceo will be also be attending the Forum.) The company's mission is to roll out a countrywide network of WiFi hotspots, all the while taking care of the back-end provisioning and billing, with a goal of 5000 public hotspots within a year. In short, it's trying to create a "public," ubiquitous wholesale network resold by existing carriers and ISPs where users connect by identity rather than by physical location (shades of the identity management panel, page 13). "The billing system is the dirty little secret of this thing," says Brilliant. "No cfo of any enterprise will let people use this unless we can provide all the detail to the reseller for the reseller to give to the customer. Meanwhile, we have to guarantee that AT&T will never see any other partners' data." (SEE ALSO METRATECH, PAGE 76.)

At the back-end, Cometa manages the integration of everything, but it outsources all the physical connectivity to third-party ISPs, and all the customer interaction to the same or other third-party ISPs. Call it a virtual network on top of the physical one, allowing customers to roam anywhere and still get "home-style" secure WiFi access.

If you believe that bandwidth is or should be a commodity, you'll like Cometa. It's not trying to establish a brand name; that's for the ISPs and carriers selling direct to end-users or corporations. It resells AT&T backbone and Intel boxes, but only through resellers. It's trying to reduce costs and deliver service where quality is measured by reliability and problems-subtracted rather than by value-added.

For all that, Cometa is an ambitious effort, one that takes every ounce of Brilliant's considerable political skills, in a resource-short situation. It's less a question of people than of money: Because Brilliant is only a placeholder ceo, waiting for his replacement eagerly, the company has a number of positions open that can't be filled until the new ceo arrives – which will happen the Monday of PC Forum, March 24.

"Everything the customers see should be world-class, but the inside should be frugal," says Brilliant, sitting in his spacious but sparse office in a former warehouse south of Market in San Francisco. "We set up the shared network, we consolidate the billing, but that's all. We lean heavily on our partners; we're a virtual company ourselves. The good side of our birthing arrangement is that we get invited to dinner with everybody. But we're a start-up, not a joint venture. When we have a meeting with an RBOC, they sometimes bring 30 people. We don't have 30 people in the whole company! We don't have people to prepare briefing documents. Our office rent is $8,000 a month, not $80,000."

Nonetheless, the company has made substantial progress. Adding to its birthright contract with AT&T, Cometa has just announced an agreement with iPAss to resell Cometa service under the iPASS label to its own customers. Together, that gives Cometa access to 50 percent of the US corporate VPN market. And it was an integral part of Intel's Centrino WiFi launch (SEE PAGE 3), announcing an agreement to roll out hotspots at McDonald's in Times Square – and possibly most of McDonalds's 13,000 other US locations.

"It's a small technology with huge disruptive capabilities," says Brilliant. "If we succeed, people won't ever think of a fast-food restaurant in the same way. It will affect enterprises' location and staffing decisions as part of the infrastructure, just like the build-out of roads and suburbs and telephone systems in the last century."

Jeffrey Citron, Vonage: ET, use your PC

While Marc Benioff talks about the end of software, Jeffrey Citron talks about the end of distance as a factor in telephony. "The concepts of distance and time need to be removed," he says. Why can't you get onto the phone network the way you can get onto the Internet? Dial in from anywhere; have a phone number anywhere, talk as long as you like. Why not benefit from always-on, just like the Net? Indeed, the parallels are rife: Vonage is the first broad-scale offering of Voice Over IP (VoIP) in a way that makes it accessible to the average consumer, just as Salesforce.com offers infrastructure-free, bite-size software services.

The only mystery is why it hasn't happened already. Perhaps the people who were funding all the crazy things that did get funded three years ago couldn't see the point: There's nothing protectable. VoIP is based on open standards. Anyone can do it. And where's the sex appeal? B2B was hotter; selling to retirees in Florida so they can call the grandkids more cheaply lacked. . .well, it sounded almost utilitarian.

So it took a Jeffrey Citron, with his own money to fund his own idea, to make it happen. Citron destroyed some of the old business models on Wall Street with his previous company Datek; now he's taking on the incumbent telco world. As on Wall Street, he says, "It's simply not cost-effective to do it the old way. The old business models don't make sense anymore." On Wall Street it was fixed commissions and limited distribution of information; in telco, it's a vast, circuit-switched infrastructure, protected from market forces, that overuses capacity and a system of regulation designed to reward past spending rather than current efficiencies.

"They say, 'We have to protect the incumbent monopoly, guarantee that this company can recover its costs'," he mimics. "But why? I'm a very excitable person, and it excites me to see some problems that are so easy to fix. Telecom is the world's largest market, with the most incumbents in place, and it's ready for a revolution."

He has been at it for two years now, having left Datek in October 1999. (He recently paid a personal $22-million settlement of a lawsuit concerning certain practices by Datek; depending on your point of view, you could call those practices breaking the law, or you could call them a sort of civil disobedience.)

The company is just now rolling out its service; it has almost 20,000 customers and is adding about 1000 a week. That should speed up with the recently announced addition of Earthlink as a reseller.

So far, the greatest appeal has been to techies, but the goal is to reach a much broader market of cost-conscious consumers. (However, the market is limited to the 20 million people in the US who have broadband; Vonage will expand to Europe and probably Asia next year.)

In the long run, however, whether it's Vonage or its inevitable competitors, the real benefit will be wresting the voice network out of the hands of copper-bound operators. Vonage is already offering a slate of value-added services such as portable phone numbers, Web-accessible voice mail (again, independent of location), call waiting, caller ID, call return, call blocking, call forwarding, call transfer and real-

time billing. It's great that Vonage is offering these features. What's even greater is that third parties will be able to offer most of them too, without waiting for permission from Vonage. However, Vonage and its resellers do have one continuing advantage: a direct billing relationship with their customers.

Bill McGlashan, Critical Path: Man with a message

"The easy answers in convergence are technical," says Bill McGlashan, ceo of Critical Path (SEE **RELEASE 1.0**, JUNE 2002). "They include things like seamlessly traversing WiFi, 2.5G, and 3G networks and having a single address or number across devices. But the more interesting question is: Can the industry satisfy customers and make profits doing so?"

"With WiFi and technologies like SkyPilot threatening to kill the last-mile duopoly, and with all the new entrants providing more advanced IP communications, carriers are now facing the threat of becoming commoditized - being a simple pipe. They need to provide value-added services," he says. . .indeed, the sort of value-added services Critical Path provides.

His company offers messaging solutions, crossing the gamut from simple e-mail boxes to high-end servers that can transfer messages from one format to another (data, voice, SMS, instant messaging, multimedia) and that can also manage presence, address books, directories and other facets of identity. Its software supports a total of 200 million users worldwide, including 15 million on CP-hosted servers.

For now, CP sells on all sides of several fences: software licenses or hosted services, and to customers including ISPs, telcos and post offices as well as enterprises. Customers include British Telecom and O2 in the UK, Vodafone all over, Telecom Italia and Wind in Italy, France Telecom, TeliaSonera and Hutchison 3.

McGlashan is quite clear that he sees a battle brewing for control not just of the communications business, but also of the identity business.

"The communication provider effectively manages the mailstore for the enterprise while [Microsoft] Exchange's goal or IBM Domino's goal is to keep the mailstore in the enterprise and sell software around it. As you untether the users, they want access to more of these services wherever they roam, so it leaves an opening for the carriers to own those applications," he says. And Critical Path is happy to help them do so.

"The data pipe is more meaningful and relevant and richer than a traditional land line," he continues. "Unlike land lines or cell spectrum, where operators control access both to consumers and value-added service providers, the data network is open to anyone. All you need is basic billing and provisioning and you're in business."

That's the reason the Internet is so much more service-rich than either land lines or cell phones. But Critical Path is also looking to keep a hold on its customers, and it sees the address book as the way to get and maintain that. It's what he calls the PAB, for personal address book, which leads to the NAB, or network address book. "Users have to go back to that same server for functions such as forwarding or instant messaging within their community. Today, the carriers are doing everything they can to own that; that's where the stickiness comes from. For example, O2 says they're seeing real upticks in retention because of it." Could Critical Path ever become an independent provider of such a service? He thinks not: "We don't see consumers paying for it. The battle is between enterprises and carriers."

Critical Path itself appreciates the openness of the data market, but things go only so far. Although it's eager for third-party applications, McGlashan says, "We're not a platform, though we're at least a channel to market."

As a consumer himself, he's excited. "The boundaries of a company literally become just identities and rules. If you have a WiFi network that really works well, why ever plug into a LAN? You want your data on the Net, reachable from wherever you are."

INTERVIEW - Sergey Brin, Google: Googling Sergey

There's really no need to introduce Sergey Brin, co-founder and president of technology of Google. You can find out all you want through Google. But it may not be visible yet that Brin has decided to devote more of his time to improving search quality rather than to management issues. That sounds like a rather limited job description, but search is the center of the universe for Google. "I expect that our search and ranking function will become more complex over time," says Brin, though he won't say how. "There are limitations to how far you can take the simple elements we started with."

Meanwhile, there's the perennial question one hears more and more as people move from liking Google to depending on it: Is Google too powerful?

There are three kinds of people who ask that question: people who want to find stuff, people who worry about people being found, and those who want to be found. Those who want to find stuff worry about censorship, mob rule, information control and the like; they probably have a case – against any kind of centralization, though it's worth noting that Google has no stranglehold on anyone. If it started blocking things people wanted to see, they would soon try someplace else. Meanwhile, Google reflects and probably amplifies people's choices and fads, but we doubt it creates them. If Google is weather, then network television is climate change.

Those who are concerned about privacy have legitimate questions, to which Google tries to give answers, but how can a company promise to be pure forever? At some point you simply have to trust them. . .or not. It's worth noting that they are profitable and private – and thus hardly susceptible to pressure to do the wrong thing.

Those who want to be found mostly have commercial concerns. "Every time somebody drops in the results, someone else goes up, and those people are pretty happy," Brin says. "There will be fluctuations. We're by no means perfect. There's less predictability in the search results, but that's probably better than the same person winning all the time. When people see obvious spamming or manipulation, that evokes an emotional response. But it's pretty limited to the broadest queries. No one's manipulating 'piano tuners in Cincinnati,' yet that's commercially valuable too."

Most recently, Google has done two interesting things: One is to acquire Pyra, creator of the Blogger blogging tool and host of over a hundred thousand blogs. "There are all kinds of potential synergies," says Brin, "but we're not yet really counting on any of them. Over time, maybe we can make it easier for people to blog via the tool bar. Perhaps we can do freshness detection by using content from the blogs. People have all kinds of complicated theories about what could happen: would we put cookies on their blogs? But basically, we just thought it was interesting, and a kind of content we should know more about: Blogger was a success, but not so much that it was succeeding commercially. The idea is to combine Pyra with our scale and infrastructure and ads, and make it a more solid business. Google is a good home for interesting technology that might not be commercially successful on its own."

The second is the launch of its new content-targeted online advertising service, an extension of its current Adwords service. Adwords places clearly marked, text-only ads on Google's results pages; advertisers select the combinations of search terms they want to be next to and pay by the click.

Google has now taken that notion one step further: "We use the information on the page as input, and try to come up with the best possible ads," says Brin. "The ads don't need to be pushy or flashy. They're just text, but they're relevant." The service is still in beta and is running on sites including the San Jose Mercury News, HowStuffWorks, and Google's own Google Groups. He adds: "The service takes advantage of some more advanced technology that addresses semantics that we haven't put into the search yet."

In essence, Google makes the page you're looking at the center of the universe and shows you merchants conceptually nearby. "This could really change the Web," says Brin modestly, and he's right. "It will make publisher's space much more valuable, and it will reduce the value of pop-ups – or make their lack of value more apparent!"

As Shelby Bonnie observes (PAGE 34), relevant ads enhance the Web experience; others detract from it. But there is one thing Google can't do yet. The ads are relevant to the content the user is looking at, but one has to assume the user is there on purpose. As Dan Rosensweig observes, Google doesn't know about you – for better or worse. If there were some button with which the user could define, say, his location, the relevance could increase even more. But that would raise those privacy questions again!

EVENING PRESENTATION – Data and Development

On Tuesday evening, we take a look at the broader world, and two emissaries from that broader world take a look at us. Much of the promise of information technology is the economic benefits and the enhancements to opportunity and liberty it will bring. Computers and communication tools offer efficiency, speed, better allocation of resources. . . . They help markets to work openly and harness human energy to create value. That's nice in the developed world, but surely it means even more in developing economies, which suffer from isolation, inefficiency, lack of information, constrained and corrupted markets, overregulation and other problems. The societies around these markets often suffer from restricted information flows and misallocation of resources.

Dennis Whittle and Meitamei Ole Dapash are among the people doing something about these problems. Rather than just giving money or goods, they are trying to build the underlying systems that will allow underdeveloped communities to come alive.

Dennis Whittle, DevelopmentSpace.com: A market for opportunities

Dennis Whittle left the World Bank in 2000 with Mari Kuraishi, after they had successfully run two venture marketplaces to raise funding for projects too small or risky for the Bank's normal processes. The projects were a success, but the two bankers felt that they could have greater impact by starting smaller with their big idea. They co-founded DevelopmentSpace.com, a for-profit marketplace devoted to the exchange of resources and information for development projects.

DevelopmentSpace is a kind of eBay for development projects, complete with project descriptions, opportunities for people either to find or to offer resources, a reputation system, and the like. While waiting to develop a user-rating system, the DevelopmentSpace founders have called on their old connections for established NGOs such as Mercy Corps and World Neighbors to validate the projects and to give some initial assurances of the integrity of the players. Individuals with other things to give – advice, computers, books, etc. – can post their offerings. The overall spirit, however, is not charity but enterprise: Think sewing machines, not cartons of clothing.

The sponsoring organization for the Website is a private, for-profit company called ManyFutures Inc. "Mari and I would not have been able to get this idea off the ground if it were a traditional non-profit. To be successful and scaleable it had to have the discipline of a business: To provide a customer-focused and market-driven platform requires more than good intentions. We also wanted to be able to invest our money and get a return, so we can keep doing other things like this." One of its guiding principles is to foster greater accountability in the world of development, where success is often measured by how much you spend rather than by social or financial returns. (CF. NETOMAT'S DOUBLE BOTTOM-LINE APPROACH, PAGE 64.)

Total funding is over $1 million, from the founders, friends and family, and even a few foundations who want this idea to succeed. The commercial side contracts out its services to a not-for-profit side [shades of the open-source hybrid model!] and there are two fiduciary boards as well as an advisory board of people from business and the non-profit sectors around the world to keep things fair and transparent.

So far, DevelopmentSpace's site and the underlying exchange services have attracted over 350 projects in over 70 countries. There are nearly 2000 registered users, and over 80 projects have gotten some funding. The projects range from a Cambodian team that employs handicapped people to do data-entry (for the Harvard Crimson's archives among other things) to the Amboseli Maasai Community Cultural Village.

Meitamei Ole Dapash, Maasai Environmental Resource Coalition: Having a voice

Amboseli Maasai Community Cultural Village is a project of the Maasai Environmental Resource Coalition (MERC). The coalition's founder and executive director, Meitamei Ole Dapash, grew up in the region and is a Maasai himself. Says Dapash: "Without DevelopmentSpace, we would never have had so many opportunities to present proposals to donors," he says. "They're a voice for regions and NGOs and communities that would never be heard."

He is an exception among his people, who once considered education a symbol of oppression and have a literacy rate of 1 to 2 percent. Dapash went to high school and then studied rangeland management and ecology at Egerton University in Kenya. As recently as the 1970s, the 450,000-odd Maasai people called their land "the land of milk and honey." But when their closed "reservation" was opened with independence in the 60s, they were left uneducated, isolated, and with no tradable resources or assets to join the rest of the world, says Dapash. He continues, "The Maasai culture has become dependent on handouts. We have to build a culture that can fend for itself, with education and economic development." Among MERC's projects is a scholarship program for primary-school children; it has also built two schools. (Computers in schools are still a distant dream. Most of them don't have telephones or electricity.)

Another initiative is in tourism. The Maasai lands, which include Mount Kilimanjaro, generate almost a billion dollars a year in tourism revenue, Dapash says. "But we see none of it. We are lobbying for an employment quota so that local people can get a fair chance. We use Maasai culture by building community-run villages that give educational experiences to tourists, using the revenues for wells, schools and clinics."

How relevant is high-tech to all this? We hope to hear more from Dapash on this after the Forum, but for now his focus is on communication rather than computing: "In Kenya it costs me $3 a minute to call Washington; even calling within Nairobi is expensive. But even more difficult is access to the telephone itself. A person or NGO wanting a telephone installed has to pay large sums of money in deposit and then wait for weeks or months," he says. However, as elsewhere in the world, "the mobile telephone industry has taken the country by storm," he says. "Although the fees are still high, its availability, convenience, and reliability are a threat to the land-line telephone industry. Amazingly, despite the high costs, the mobile industry is what I call 'equal-opportunity technology,' where the rich and the not-so-rich can both enjoy the same quality and availability of services." He adds, "For those with access, e-mail and the Internet are a key resource. The ability to transfer files and get information is not just a question of cost; it's something we simply couldn't do any other way."

THE GALLERY (COMES ALIVE)

BY CHRISTINA KOUKKOS

When we think about something coming alive, we think of it as taking action on its own – sending out links and tendrils in directions we couldn't anticipate, straining at the bit like a horse or taking off after a rabbit like a dog. (No one reins in an automobile. . . .) Part of being alive is being impulsive and spontaneous.

In the Gallery, in the foyer outside the conference room, you will see data do unexpected things as it comes alive. All the companies in the Gallery breathe life into data in one way or another. Four of them – Anacubis, Groxis, Fractal Edge and Microsoft – will use their visualization techniques to make you *come alive, mapping (public) information from attendees, including results from Emode's personality test (*SEE PAGE 72*). It should be enlightening to see the same data and people take different forms through different tools.*

The two other demonstrators find new ways for people to come alive at a distance, by melding the interactive multimedia of Web pages with the communication functionality of e-mail (Netomat) or by bringing objects and avatars of real but remote people to life in a vast virtual world (There).

Anacubis: Show me your links

Ceo Mike Hunter differentiates anacubis from other information visualization and analysis companies by its heritage: It is a two-year-old business unit of i2, a UK-based developer of visual analysis software for law enforcement and intelligence professionals in Europe and the US (not the US supply chain software vendor!). Over its 12-year history, says Hunter, "i2 integrated feedback from its customers to refine its technology into a sophisticated tool for information analysis." Anacubis's mission is to repurpose this technology and expertise for the business sector.

ANACUBIS INFO

Headquarters: Cambridge, UK
Founded: January 2001
Employees: 25
Key metric: 4 customers
Funding: privately held by i2, Ltd.
URL: www.anacubis.com

Anacubis (short for "analytical cubism") positions itself as a developer of data-analysis rather than information-visualization tools, as evidenced by its partnerships with LexisNexis, Dun & Bradstreet Questel Orbit and Bureau van Dijk – owners of deep and complex

structured data sets. Partners first map their information schema to the proprietary anacubis XML schema, and then the Java-based viewer pulls in the data and transforms it on the fly into a colorful, meaningful display of icons and typed links. It's quite compelling to look at a D&B and see second- and third-degree links showing interlocking director relationships, for example. . .or the fact that Juan's father is an investor in a major customer of his company.

Says vp of business development Greg Coyle, "While our competitors are trying to promote the benefits of this type of technology on their own, we are aggressively licensing our technology to large information providers to build the market and our user base." That gives anacubis both content and distribution channels that competitors mostly lack. In addition, this month it expects to launch a free, publicly available tool for Web search, based on the Google Web APIs, which it will demonstrate at the Forum. Searchers can save, print and share views in the software, and even update information in saved views of query results.

In addition to its third-party licensing activities, its core business will center around a desktop application, due out in the third quarter (a preview of which will be demonstrated at the Forum), which will allow users to combine visualizations of various data sources, leveraging the proprietary XML schema. Of course, this works only for a supported data source that's been mapped to the anacubis schema. The company is courting a number of additional information providers in an effort to widen its marketplace footprint.

At the moment the company is focusing on customers with complex data analysis needs, such as investment banks for due diligence, though Hunter also imagines pharmaceutical companies using anacubis tools to rationalize research projects.

Fractal Edge: From clicks to maps

Fractal Edge founder Gervase Clifton-Bligh conceived of fractal maps in 1998, while waiting for Web pages to load over a 28.8K connection. "I was thinking of a personal Web spider that came with you as you surfed the Web," he recalls. "So when you hit the point of, 'I know I'm at the right site, but I don't know where the information I'm looking for is,' it would show you a map of your surroundings," thereby avoiding the click-and-wait.

"Because each click took so long, typical Web designs have a very high branching quotient [number of link choices, or branches, per page]," he says. "One page might

have a branching quotient of 100, and the next one another 100. That's equivalent to 10,000 pages being accessible with just 2 clicks." He took that navigation problem, plus his visualization metaphor, and searched for a way to display all the links of a Website within 4 or 5 clicks.

FRACTAL EDGE INFO

Headquarters: London, England
Founded: December 1998
Employees: 6
Key metric: 20 customers
Funding: $1.6 million from Celtic House and angels including Chris Poll
URL: www.fractaledge.com

The result is what Clifton-Bligh calls a "fractal map," a graphical, zoomable interface that allows users to instantly understand the structure of a data set – as long as it has (or can be assigned) structure – in a way that traditional two-dimensional lists or outlines can't match. "We can display thousands of items and millions of relationships on a single screen in a comprehensible way," he says. An international patent for the product was published in March of 2000, with the first implementation released in July of that year. The tool is standards-based and architected with a data adaptor layer to allow quick integration of new data sets from multiple sources.

The goal is to replace traditional ways of interacting with information: It offers a free file-management product, Fractal:PC, as a front-end to the Windows file manager – usually a nice fractal structure. So far, half a million copies have been distributed.

As faster connections have proliferated and navigation has become less torturous, Clifton-Bligh and Laughton changed the company's focus from simple navigation to aiding analysis and decision-making. In the short term, the company is selling products and custom solutions aimed at the financial services vertical and the business intelligence horizontal: asset managers, financial directors, and so on. "It puts decision-makers in touch with the raw data instead of a simple summary, but in a way that's not overwhelming," says Clifton-Bligh.

The company is an authorized third-party software provider for Bloomberg, which allows fractal maps to be integrated into its data services package using Fractal: Financial, a shrink-wrapped software product that the company will unveil at PC Forum. Other (unnamed) current customers include "one of the top three asset-management companies in London and one of the top three credit-rating agencies in the world," according to Laughton.

In the long term, however, Fractal Edge sees software or service vendors selling fractal maps embedded into their software as the fastest way to achieve its goal of ubiquity. For example, Word Menu, a developer of dictionary/thesaurus-style reference software, integrated a fractal map into its application, for which Fractal Edge charges

a development license and royalty fee. The company also recently started working with IBM's Knowledge Discovery group to integrate fractal maps into its products.

Groxis: Great balls of data!

"We bet the architecture of our software platform on Web services and XML. As luck would have it, that was the right bet," says Groxis ceo and co-founder R.J. Pittman. "RSS [RDF or Rich Site Summary] and other XML-based content networks are spreading fast." Since we first covered Groxis (SEE **RELEASE 1.0**, JANUARY 2003) interest from potential clients has picked up considerably, according to Pittman: "We have senior executives from 125 technology companies in the pipeline to chase after."

Groxis is the creator of Grokker, a tool that can create various visual representations (some similar to Fractal Edge's) of relationships within structured data sets. As companies use XML to structure their data, Grokker can provide what Pittman calls "the last mile." He explains: "We're the interaction with the end-user. It's more than information visualization. We've made it portable: You can take a conceptual cluster of thousands of documents and share it with anyone with the free reader product, Grokker Lens."

He continues: "We are about content management and building a universal information currency" for information views, similar to the way Adobe made PDF files a universal standard for sharing formatter documents. "We expect our licensees to create new visual front-ends to Grokker to suit their needs most appropriately."

GROXIS INFO

Headquarters: Sausalito, CA
Founded: April 2000
Employees: 10
Key metric: 500-plus installations
Funding: undisclosed amount from Compass Advisors, EcoTrust, Grok Partners, Venture Factory Partners and angels
URL: www.groxis.com

Groxis has developed plug-ins to support SQL platforms such as Oracle's Universal Server, Microsoft SQL Server, and others. It will build support for 15 more data sources, including SAP and Siebel systems, in the coming months. The company also has plans to release the Grokker SDK with an open-source back end that allows developers to build custom plug-ins for any structured data source. "Grokker can link internal corporate data with public data sources such as Amazon, Teoma and LexisNexis and normalize it into one intuitive interface," he says.

Pittman says that 10 major search engines have approached the company, as has Reed Elsevier, the parent of LexisNexis. At PC Forum Groxis will be announcing its first major enterprise customer, a large carpet manufacturer that is building its new online marketplace around Grokker Enterprise. The Website will handle 50,000 different SKUs and will link transactions directly to the company's supply chain.

Microsoft's Polyarchy: How am I connected to thee? Let me count the ways. . .
When we first covered Microsoft's forthcoming Polyarchy (SEE **RELEASE 1.0**, JANUARY 2003), we described it as a tool "best suited to help people see two or more orthogonal hierarchies." Its creator, directory architect Kim Cameron, calls it a relationship viewer. However you describe it, a number of companies are using a pre-release version to discover how the disparate data and hierarchies in their businesses are related – and in how many ways.

"We developed it as a way to help figure out who you were interacting with," begins Cameron. "For example, people at Microsoft use it when they want to e-mail or phone people whose names are 'just out of reach' – they know the person's name is David, and that he works in Craig's organization, so who are the Davids who work for Craig and what business are they in? They see five or six people along with their place in the organization and immediately figure out who they are looking for."

All the Polyarchy trials are under nondisclosure, but that doesn't curb Cameron's enthusiasm for describing how it's being used: "The uses that people find for it are quite beyond our expectations. We have people doing genetic research on it. Another group is doing pharmaceutical taxonomies. It's a question of showing a number of many-to-many relationships, and these testers felt they could do that with this tool.

"An interesting people-based applications was a bank that wanted to see how account representatives and financial advisors were working with the same customers. Using Polyarchy they can take information about customer meetings from their calendaring software and build a poly-hierarchical view of the business relationship. So two bank employees who didn't know they were speaking to the same groups [of customers] can get together. It's combining calendaring and CRM."

Polyarchy will be included as a technology preview in version 3.0 of Microsoft Metadirectory Services, which will ship 90 days after Windows Server 2003, in accordance with what Cameron terms "our suitably complex shipping schedule." He continues, "We're reserving the right to evolve it over the next year, working closely with the customers who want to participate."

Netomat: From cut-and-paste to chop-and-dice-and-post
Netomat debuted in June 1999 as an art project at the Postmasters Gallery in New York, when it was downloaded by nearly one million people from 80 countries. "It still is an art project, but one that has a slightly different business model from a typi-

cal art project," insists co-founder and chief scientist Maciej Wisniewski. "It is akin to that of a software company."

Wisniewski and Tamas Banovich, co-owner of the gallery, decided to collaborate to define and develop this alternative business model. Tamas brought in Alan Gershenfeld, a former Activision executive who had been making a documentary at Postmasters, who in turn brought in Kris Ramanathan, the former head of US operations for Financial Models, a portfolio management software company. Together the four founded netomat inc. in early 2001.

NETOMAT INFO

Headquarters: New York, NY
Founded: November 2000
Employees: 17
Key metric: operating with a double bottom-line
Funding: $5.7 million from Topspin Partners, William Harris, ProVenEx and angels
URL: www.netomat.net

Netomat's mission is to take advantage of existing technology to facilitate communication in an open way. Using the netomat software, people can create messages that integrate text, digital pictures, drawings and sounds (including their own voice recordings), and publish them to the Web or send them via e-mail or instant message.

Of course it's already possible to do all this, but netomat, now in beta, also allows users to embed tools so that recipients/viewers can edit and annotate messages, with all changes captured. "A network of people can communicate using this set of documents, so it's not really a document anymore; it's an application," Wisniewski explains. And unlike existing applications, which tend to be template-driven (he mentions PowerPoint), the standards-based tool allows and even encourages the expression of personal aesthetics. (PC Forum attendees will get a sneak preview.)

The company is funded by an interesting mix of venture capitalists, and operates with a "double bottom-line." Explains Gershenfeld: "Part of the vision of netomat is a commitment to providing a strong return on capital, but also a cultural return. We have traditional VCs and also ProVenEx [a Rockefeller Foundation VC fund], which is interested in both capital and cultural returns." Cultural-returns metrics include requirements to make its Netomatic Markup Language (NML) source code publicly available; to provide the its software to certain non-profit organizations; and for the founders to allocate a percentage of their personal equity stake to a fund to support the "use of creative impulses to enhance the well-being of the global community."

Though netomat won't be released until this summer, it has already begun to generate revenue in a pilot with a major communications company, according to Gershenfeld. Once netomat is released, it will be distributed as a subscription service, with the back-end infrastructure provided by the company.

There Inc.: It's now time for this space

There, Inc. ceo Tom Melcher is trying to achieve on his long-standing goal of creating a "metaverse," or online virtual world. After almost five years at McKinsey, an aborted attempt to get the rights to Fantasy Island for video-based MUD ("Luckily that didn't happen," he says), and a two-year stint as head of business development for early virtual world vendor daVinci Time and Space (SEE **RELEASE 1.0**, AUGUST 1994), the Web happened to him. "I came to the conclusion that it was the right time [to create a metaverse], for two reasons. First, the technology in consumers' homes was finally capable of delivering an aesthetically compelling experience, with the $1,000 PC and ubiquitous 56K bandwidth. Second, and far more important, was a change in behavior. You can't expect consumers both to change their behavior and use a new technology at the same time. But you *can* teach them how to make an existing behavior easier using technology. In 1992 [with daVinci Time and Space], we were trying to do both things at once. Now that everyone uses IM and chat, people are looking for a better (not new!) way to communicate. That's what There is doing."

Melcher joined There as ceo in 1999. "They were a team of engineers in search of a business leader. I was a businessman in search of a team of engineers. It was like a Reese's Peanut Butter Cup commercial," he says. The company's business strategy is to monetize socializing and community. "AOL members spend 35 percent of their time online using chat or IM," observes Melcher. "That's more time than e-mail. Yet the portals can't monetize that. Advertisers won't buy ads in chat."

THERE INC INFO

Headquarters: Menlo Park, CA
Founded: April 1998
Employees: 90
Key metric: 10,000 beta testers; 84,000 on the waiting list
Funding: $33 million from Sutter Hill Ventures, employees and angels
URL: www.there.com

But according to Melcher, There partners Levi's and Nike *will* pay to sell the branded virtual jeans, hoverboards, and other items that There members buy using There-bucks, its virtual currency. Still in beta, There will also generate revenue from subscription fees, by taking a cut of what members sell, and in some non-consumer uses being developed by vp of strategic initiatives Robert Gehorsam.

The company's target market is women, under the assumption that where women go, men will follow. And during the beta tests, women have responded 30 percent better than men in key metrics: conversion, retention, money spent and time spent.

Melcher has clearly thought through the business reality of creating a virtual world – something that many have tried and mostly failed at. His enthusiasm is tempered by experience: "No one else is doing this," he says. "We're either really stupid or really smart. We'll know in six months."

COMPANY PRESENTERS

BY CHRISTINA KOUKKOS

This year's company presenters all focus on data – how to gather, expose, structure, manipulate, analyze and use it to address specific market needs. Of course, what's really interesting is how they do it:

Telco/devices

These companies each offer a service or platform that mediates between different parties or devices and reduces the friction that the current telco environment imposes on new players.

ACTION ENGINE offers a standard platform for mobile phones, enabling users to do more with their phones and allowing carriers and third parties to offer content and enterprise applications across multiple devices and operating systems.

METRATECH provides a modular, telecom-oriented billing system as a Web service, making it easier for anyone to set up a service and outsource billing.

RAPPORT TECHNOLOGIES allows enterprises to remotely provision and manage a range of mobile devices.

Data

The point of collecting data is to structure and analyze it so that it's useful. These three companies find meaning in data, and then tailor it for the users: lawyers, online merchants and individuals with a interest in their unique personalities.

CATAPHORA analyzes corporate documents to model communications and interaction patterns.

ELECTROBUG collects and sells competitive pricing data for online retailers.

EMODE creates profiles of individuals in order to sell customized services and information back to them.

Enterprise

Enterprises may want cross-everything integration, but there's still hope for small companies who come up with a compelling new tool. Each of these companies solves a particular problem with a clever solution.

ENTOPIA generates deeply contextual and searchable metadata from enterprise application usage, helping people find local experts while preserving privacy.

VERSALENT allows customers to build zero-install, browser-based applications.

WHOLESECURITY protects identities from Trojan horses and other eavesdropping software during online transactions.

Descriptions of all the presenters, in alphabetical order, are below.

Action Engine: Cell-o-phone wrapper

Action Engine co-founders Craig Eisler and Cris Pierry met at Microsoft, where Eisler was general manager of the Windows Media Platform Group and Pierry was director of Windows Media Runtime. They left in early 2000 to found Action Engine, a services platform for the mobile devices they saw becoming smart, powerful computing platforms. . .potentially.

Mobile telephony carriers gearing up services for data-based transactions are facing constraints due to the browser model. "The browser is not the ideal platform for transactions on mobile devices," observes Pierry, chief product officer. When we interact with the Web on a pc, we expect richness of information and a high level of interactivity to go with our fast connection, 19-inch monitor, mouse and keyboard. On a cell phone or other mobile device, however, we expect immediacy and intimacy despite the small screen, slower connection and awkward data-input capability. People don't want to browse the Web with their mobile devices; they want to complete tasks: book a flight, make a stock trade, get directions to a meeting.

Action Engine's Web services platform is built on those assumptions. It includes a thick client that uses the processing power of the device to share and reuse data across applications and minimize the need for data input. In part it does this by having an understanding of the data it's working with, enabling it to act more intelligently than a plain old browser. It allows Action Engine's content partners – including Microsoft

MapPoint, AccuWeather, the Associated Press, Restaurant Row, InfoSpace, the Automobile Association of America and Yell – to develop applications that minimize back-and-forth data traffic.

One of the biggest challenges for developers of content applications and for network operators, including Action Engine partners Orange and O2, is the need to support so many "standard" cell phone platforms. Action Engine makes that task easier, providing a standard platform for all supported devices. It is working with OEMs such as Handspring and HTC (which manufactures the iPAQ for HP and the Zaurus for Sharp) and supports operating systems including Pocket PC Phone edition, Smartphone 2002, Symbian and Palm.

ACTION ENGINE INFO

Headquarters: Redmond, WA
Founded: February 2000
Employees: 48
Key metric: 2 carrier customers
Funding: $19 million from Northwest Venture Partners, Northwest Venture Associates and Spangler Ventures
URL: www.actionengine.com

The Action Engine client gathers any information from the user offline and validates the data on the client side before sending it to the content server. "For example," says Pierry, "say you use the Yellow Pages to find a car mechanic, and get back a list of five shops in the area. [Using a menu-driven interface] you can add that information to your contact database, auto-dial the phone number, enter the resulting appointment into your calendar, and then move the address into a mapping application. Our client makes that data an actionable item," akin to the options available if you right-click a file in Windows.

The Action Engine platform also includes device management services to help a user, carrier or enterprise centrally configure, manage and provision mobile devices. It incorporates security services such as the ability to remotely lock a lost or stolen device and to back up and restore data.

Cataphora: Meaning from mess

Elizabeth Charnock's took a tortuous path through Silicon Valley, from a human-factors engineering job at HP, through Sun to Verity to a start-up she founded called Troba (SEE **RELEASE 1.0**, JANUARY 2001). But it may in fact be the most direct route she could have taken to her current company, Cataphora. Cataphora's C-Evidence "evidence analytics" tool analyzes corporate documents including e-mail in order to model communication and interaction patterns, often in the context of (threatened) litigation. C-Evidence then uses its analysis to help retrieve causally related documents and present the concatenation of them as evidence, reconstructing and interpreting events that are in dispute. The goal is to find threads of meaning amongst a

clutter of documents, and help attorneys understand and play the cards in their hand much faster.

At HP and Sun Charnock worked on intelligible interfaces, and at Verity she learned both the power and the limitations of heuristic search and concept hierarchies. At Troba, a start-up dedicated to usability assessment for Website owners, she and her team developed the concept of modeling users' task-oriented behavior.

When Troba lost its funding Charnock started negotiations with Netusability of the UK. "The due diligence was very detailed," she recalls. "They asked us things like how long and how many meetings on average it took us from start to finish to book a deal with a large partner." She checked through the company's servers and e-mail to find out, but there were no files labeled "partnership negotiation meetings."

"Some of the answer was in e-mail. Some was in group calendars, or status reports or business development plans. I needed it all tied together, and by something that understood basic business interaction concepts like 'meetings.' Even though I was a good user of search from my time at Verity," she recalls, "it was very difficult to collect the right records."

CATAPHORA INFO

Headquarters: Redwood City, CA
Founded: 2002
Employees: 15
Key metric: $250,000 initial contract last year
Funding: self-funded
URL: www.cataphora.com

That experience suggested an opportunity – detecting the meta-data and patterns in corporate communications to answer interesting questions. "The more you rely on things that are not content, the more you can get around things that are coded," she says. By modeling communication patterns and highlighting anomalies, you can detect all kinds of interesting things: who talks to whom and how frequently and in what tone, how Juan regularly forwards Alice's mail to a third party, when conversations start and stop. . .even though there may never be a mail that uses any keyword. People are more likely to say, "Let's go ahead," than "Let's cook the books today." Context supplies meaning: Indeed, it takes a whole movie to give full impact to the pedestrian statement Rick makes to Ilsa (in *Casablanca*): "We'll always have Paris."

Her initial instinct about markets were pharma - a big customer sector for Verity, which helped those clients assemble documents for FDA filings or intellectual-property management – and homeland security. But by chance, she talked with the lawyer of a company that had just been served a subpoena. That company offered her $250,000 up front, plus computers and other facilities, to analyze its documents. That contract was Cataphora's initial funding – and defined its initial market focus.

The company now has 15 people. Its C-Evidence system goes through e-mails, instant messages and documents, and derives communication and behavior patterns around "actors" (individuals) or groups, such as a project team or accounting group. It looks for communication threads in unrelated messages, and detects text blocks that get edited or retransmitted (or not) and the actors involved in those processes. It also notices things such a chain of mail in which one person is suddenly added to or removed from the recipient list – including, of course, blind copies. ("It could be a surprise birthday party," says Charnock, "but usually it's not.")

The output of this process is a huge graph, represented with database primitives, that acts as an index to the corpus of the documents. Then C-Evidence runs plain old heuristic text searches to pick out relevant documents from the subsets. All this feeds into an ultimately human experience: a presentation to a jury, where a good presentation can be worth millions of dollars, or years of someone's life.

Electrobug: Fly on the screen

Co-founder Mark Heynen conceived the idea for Electrobug while he was an e-commerce analyst at Kingfisher, a UK retail conglomerate. (DISCLOSURE: ESTHER DYSON IS AN INVESTOR IN AND DIRECTOR OF ELECTROBUG.) As online discount retailers proliferated, Kingfisher struggled to develop a strategy to deal with the threat – starting with a tactic for gathering and tracking information about online competitors' prices.

In April 2000, Electrobug launched as a consumer-focused price-comparison Website. By December of that year, the retailers advertising on the site convinced Heynen to switch to providing an information service directly to them instead. Retail and manufacturing are extremely margin-sensitive, so they use the Electrobug service to manage pricing, ideally neither losing profitable business nor leaving too much on the table.

ELECTROBUG INFO

Headquarters: London, UK
Founded: April 2000
Employees: about 30 worldwide
Key metric: delivers 3 million prices per week
Funding: E1 million (~$1.1 million) first round, undisclosed recent round from independent investors, mostly from the travel industry and also Esther Dyson
URL: www.electrobug.com

Electrobug's PriceFinder technology crawls the Websites of online retailers and manufacturers, replicating user behavior (filling out forms, browsing) and gathering data from the actual page or from the source code. It works for any Web page not behind a firewall or a credit card authorization screen. "When we started, we were paranoid about angering potential customers," says Heynen. "We work very closely with the Websites we crawl to mini-

mize negative impact on look-to-book ratios," a key metric in measuring the effectiveness of retail Websites.

The collected data is then structured using software that looks for patterns in product features rather than product names, so clients can compare apples to apples – or a customized DVD player from Circuit City to one from Best Buy. In other words, Electrobug lets the data describe itself: a two-room suite named "deluxe suite" in one hotel could be a "business suite" at the hotel across the street, but the features of the rooms make clear that they are the same. Most matches are made automatically, with close matches flagged for human review.

This ability to generate product categories and classify offerings is one of Electrobug's key strengths, and fits in well with the Forum's data theme. While airlines and retailers have welcomed this capability, Heynen says it has been a challenging sell in industries such as hospitality, where customers are used to defining their competing offers themselves.

Electrobug's customers pay a monthly fee for customized price-comparison reports, fulfilled from its service center in India. The reports give customers a sense of their overall pricing policy vs. the competition. Customers can manipulate the data by filtering or drilling down on a particular metric – e.g. last-minute prices – or by importing it into their own databases to analyze with their own tools.

With successes among electronics (Dixons), travel (Expedia, easyJet, Opodo), and grocery (Tesco, Sainsbury's) clients in Europe, Electrobug is looking to expand aggressively into the US and new retail markets, primarily with hotels and car rental agencies. It recently closed another round of funding (for an undisclosed amount) to bolster customer service operations in India and to invest in technology to push into these new markets.

Emode: Mirror, mirror, on the Net. . .

James Currier got the idea for Emode after three months at Harvard Business School, when he noticed students' reactions to taking the Myers-Briggs personality test. "Before taking the test, people were a bit shy. After they took the test, though, they started talking, comparing test results and laughing about it for weeks afterwards. They talked about that experience more than I've seen people talk about any movie. I thought that the Internet could transform this experience and make it better – make it instant, colorful (instead of pencil-on-paper) and sharable via e-mail (what the

students were doing anyway). Plus test results could be stored, viewed and modified years later, or combined with other information about a person to build an individual profile."

Before attending Harvard, Currier had developed broadband applications and launched entertainment startups for GTE New Ventures in LA, ran business development for STAR TV (Rupert Murdoch's satellite television service in Hong Kong), and managed investments at Battery Ventures.

EMODE INFO

Headquarters: San Francisco, CA
Founded: July 1999
Employees: 29
Key metric: cash flow positive
Funding: $9 million from August Capital, Draper Richards and angels, including professors at Harvard and MIT
URL: www.emode.com

Drawing from this experience, Currier started Emode with $9 million in funding from VCs and "people from the academic arena who wanted to make tangible and applicable all the [psychology] research that's been done over the last 100 years." The business model is simple: Collect information about people directly from them (in an entertaining way) and apply some psychological expertise to that data (via the PhDs on staff) to create a sort of mirror image of the person – Alice's career personality profile, what motivates Juan, whether Juan and Alice make a good match, and so on. Emode can then sell that reflection back to the individual (and only to that individual, insists Currier) as a custom service that – unlike most content – isn't susceptible to price erosion through duplication. "Once you can take people's intangibles – their personality, their romantic and work styles – and make them tangible, you can start building services for them."

The first services offered at Emode, starting in early 2002, are more than 160 tests and reports. And believe it or not, people love to take tests and assess themselves. They also share this passion with others: Community Websites are littered with posts from satisfied procrastin. . .erm, customers, and the Emode site helps this viral marketing along by offering to send e-mail invitations to friends.

Besides word-of-mouth, Emode has distribution agreements with eBay, MSN and Excite, and has been working with a series of e-mail vendors for online marketing. Currier insists that these marketers are double opt-in e-mail vendors, and do not send spam: "We look at our vendors and ask, 'Are you doing this the right way or not?' And to the guys who are not, we say, 'We don't want you.'" According to Currier, 25 million unique individuals have taken roughly 150 million Emode tests, and an average of 50,000 new users sign up every day. Many of them will be carefully watching what Emode does with their data.

Emode has started to leverage this customer base for core long-term business: by-permission consumer directories. The tests on the Website are designed to develop deep profiles of Emode members, which can be used to connect people for dating, jobs, roommates, gaming, travel, and so on. The first such directory, launched last October, is "Emode Match," an online dating directory. Currier won't disclose how many members convert to paying customers, but claims the company is cash-flow positive overall, including revenue from advertisements, the sale of test results, and Emode Match fees.

Entopia: Totally extended information awareness

If you want to know the status of a sales contract, you might go ask the sales director. But what if the sales director joined the company yesterday? Or what if she's one of those directors who's heavy on the schmooze and light on the details? The smart employee will quickly learn who the experts really are. Entopia (SEE **RELEASE 1.0**, JANUARY 2003) is automating that process with the launch of "K-Bus," short for knowledge bus.

K-Bus creates a new layer of contextual metadata about content and people on top of supported CRM, ERP, collaboration and file share applications, plus e-mail IMAP servers, Web pages and Entopia's own data classification and storage tool, Quantum. K-Bus crawls application log files via connectors developed by Entopia, indexing the collected data semantically and giving it social and other contexts. For example, says ceo Lionel Baraban, "If you create, read and edit many documents on a particular subject, then K-Bus categorizes you as an expert [on that topic]. If you just read documents about that subject, perhaps you are not so great an expert."

ENTOPIA INFO

Headquarters: Belmont, CA
Founded: August 1999
Employees: 50
Key metric: 40 customers
Funding: $19.25 million from Vivendi Universal, Vertex Management, Crystal Internet Ventures, Global Catalyst Partners and Walden International
URL: www.entopia.com

While competing knowledge management systems focus on a particular type of application (e-mail, CRM) or a particular type of metadata (content, read access, authorship), K-Bus supports many different applications and focuses on collecting all possible metadata, including social context – which types of people read or produce a particular document, the timing of their access (randomly or only at month-end), which department created it, and so forth.

To address privacy concerns, K-Bus is fully configurable. Customers are able to define which attributes should be indexed and which search algorithm should be used. For instance, a company could configure K-Bus so that it knows that Juan in the marketing depart-

ment authored a competitive analysis document. . .or only that it was someone the marketing department. This feature plays well in Europe, where privacy policy is much more strict than in the US.

Collected metadata can also be searched contextually. "If the ceo of a company searches for 'salary,' he is probably looking for very different data from what an employee would be," observes Baraban. Searches also use an access control list to filter out any results to which the searcher does not have access privileges.

To enhance search further, the company has developed a series of qualified algorithms based on different sectors' business logic. "For a financial services company, the notion of time is very important," says Baraban. "If I don't know what's been happening at WorldCom over the past two months, I can't be categorized as an expert. But if I am a drilling engineer for a petroleum company, I'm an expert even if I haven't read about drilling techniques in the past two months."

Entopia plans to develop APIs for building applications on top of its metadata server. It will be announcing its first two K-Bus customers at PC Forum.

Rapport Technologies: Agents in the field

Rapport president Max Toy sees parallels between today's device management space and the emergence of the PC in the 80's: "Cios were scared – they saw this wave of PC devices coming out that they didn't know how to deal with." He had the right vantage point to make this observation, having led US sales and support for IBM and then serving as vp of sales for Compaq.

The next wave comprises a motley variety of mostly mobile devices, running different operating systems and with different functionality – a situation many times more complicated. Generally this problem is solved device by device: one management solution for thin clients, for PDAs, for kiosks, and so on. While this strategy works for consumer electronics, it's a headache for businesses: "If you are a cio, you don't want to have 20 different solutions to manage 20 different devices," observes Toy.

RAPPORT TECHNOLOGIES INFO
Headquarters: Carrollton, TX
Founded: spun off from Wyse in July 2002
Employees: 35
Key metric: cash flow positive and profitable
Funding: management-funded
URL: www.rapporttechnologies.com

Enter Rapport, which spun off about a year ago from Wyse, a leading developer of thin-client terminals. Under Toy, who had been a consultant at Wyse and led the spinoff, Rapport acquired the assets of Wyse's thin-client management platform and

re-architected it to manage and provision remotely a range of devices through a single interface. The company focuses on industry-specific functions in vertical markets such as transportation, hospitality and retail. Wyse remains its primary sales arm.

Rapport's Device Management system embeds a 40K "sleeper agent" onto each device. The agent is "awakened" when a customer enters software license key, provided by Rapport to the OEM for each device. The agent then downloads management software into the device, rendering it "management-ready": IT staff can trigger automatic software upgrades and manage a logical hierarchy of devices without needing expertise on all those devices.

Toy stresses that it's not just about a remote help desk: "Most of our competitors come from the help desk world – their idea of managing a device is to solve problems. We come from the world of software distribution and provisioning on the 'edge' of the network, where repurposing is the purpose of existing." As memory gets cheaper and battery life improves, Toy envisions richer functionality for mobile device applications and greater versatility within the devices themselves – with Rapport's software allowing them to be upgraded or repurposed on the fly. He cites as an example an unnamed retail customer that uses Rapport's software to maintain and upgrade 15,000 devices worldwide.

The Device Management system is able to distribute data over low-quality, low-bandwidth connections. "Remote devices are on the crap part of the network," notes Toy. "Think about where you're seeing kiosks – airports, malls. We allow you to increase the price of a soda in your vending machine when the weather is warm."

Rapport maintains a close relationship with Wyse, which resells its software to hardware companies such as Bull, Dell and Compaq, and retail customers Sears and NAPA Auto Parts. In all, Rapport has sold-through 700,000 licenses to 5,500 customers. The company offers multiple levels of agents for OEMs to bundle, and then offers upgrades through the OEMs for its management software and maintenance and support. Already profitable through its legacy thin-client management business, it projects $8 million in revenue and $2 million in before-tax profit this year.

MetraTech: Teaching the old dog new tricks

MetraTech is transforming billing from a back-end application into a flexible Web service – one of the few companies building services for the service grid described by John Hagel and John Seely Brown (SEE PAGE 44 AND **RELEASE 1.0**, DECEMBER 2002).

Before founding MetraTech, ceo Scott Swartz was head of business development and product marketing at NetCentric, which developed an IP-based fax system. He saw that the biggest impediment to rolling out new services over IP networks was the ability to bill for them: "Even for basic wireline services, billing was the bottleneck. And when you can build new services so quickly [on the Web], you have an urgent need to set up billing quickly as well."

METRATECH INFO

Headquarters: Waltham, MA
Founded: January 1998
Employees: 70
Key metric: 20 customers
Funding: $30 million from Accel Partners, St. Paul Venture Capital, Bessemer, Meritech Capital, Lucent Venture Partners, Net Market, Prism and Valent Group.
URL: www.metratech.com

In the mid-90s he led a team at NetCentric that created the Metered Services Information eXchange (MSIX) protocol, based on SGML and HTTP. "Wherever we went to sell this idea, we got thrown out. People thought SGML was just for documents and HTTP was just for browsing. We told them, 'It's just like HTML, but for data.' But no one got it." Like many standards, it needed to be implemented in an application to be appreciated by potential customers.

So in early 1998 Swartz left Netcentric and co-founded MetraTech to build a billing service based on this protocol. "Unlike accounting, billing is about breaking the rules to diversify revenue streams. The challenge was to make the core architecture as flexible as the protocol [now converted to XML]. How do you build something that can deal dynamically with an infinite number of transaction types and business models?"

So MetraTech started from scratch, building a modular billing system that has Web services APIs all the way down to its core processes. The customers use a Web GUI to define data from various sources, building a taxonomy of services and billing metrics. (This is a market-specific version of the kind of data explicitness that Unicorn's Zvi Schreiber mentions on page 24.) MetraTech then saves the taxonomy in an XML schema to create a blueprint of business logic, including a database schema, metadata, workflow, GUI and API. Finally, its Web service development engine creates a custom billing application based on that schema.

"Our competitors can put XML veneers on top of their existing software, but at the end of the day the actual application is the same old hard-wired stuff," says Swartz, while the approach that MetraTech has taken gives it the ability to build new, more flexible applications that can accommodate clients' ever-changing arrays of services and pricing algorithms.

About 80 percent of MetraTech's 20 customers have it host and manage their billing as a Web service, for which MetraTech charges by revenue bands – a set fee for trans-

actions totaling $0-10 million, a different fee for $10-20 million, and so on. (Of course, it uses its own software to bill them.) The remaining customers license components on an à la carte basis to be managed in-house as part of their broader Web service offerings, and outsource the rest to MetraTech.

Current customers include WorldCom, Bell Canada, British Telecom, Swisscom and a number of smaller start-ups. The company was able to grow revenue by about 30 percent last year, and hopes to translate its current customers' growth and its "good mix" of prospects into similar or better growth for this year.

Versalent: . . .and then a miracle occurs!

Michael Peachey and Kevin Hakman founded Versalent out of frustration. The first company they co-founded, eMergingMedia, was a development consultancy for e-commerce and other Websites. "We were frustrated with what we could do in terms of user interface on the Websites we were building," recalls ceo Peachey. In late 2000, Peachey and Hakman decided to close down eMergingMedia and found Versalent with their technology.

Ask anyone from Versalent why its technology is special, and they'll hammer home the same message: It is zero-install and browser-based. Using the Versalent Studio, clients can build small-footprint custom applications that run in a Web browser but have the functionality of desktop applications.

VERSALENT INFO
Headquarters: San Francisco, CA
Founded: March 2001
Employees: 8
Key metric: operating budget of $2.8 million
Funding: financed by the founders
URL: www.versalent.com

A Versalent application is launched by typing a URL into a browser, initiating a one-time download of about 250K into the browser cache of standard application modules (such as a dialog box) and communication objects, plus application-specific design and business logic. The browser handles security and memory management.

Once the objects are downloaded, each of the data schematics – objects that get data from Web services feeds, databases, application servers, and so on – pulls and displays its data according to instructions from the application, and then waits for either some other object or the user to tell it what to do. Each object has its own relationship with the data, with a local communication broker mediating, so the user can drag and drop objects to transform the application on the fly.

"Your Web browser acts as its own application server," says Peachey. "All the brains are in the workstation after that first feed." The technology is standards-based and,

unlike most of its competitors, is built entirely in XML, XSL, Javascript and DHTML, eliminating the need for plug-ins, Java virtual machine compatibility and training IT staffs in a new programming language. Peachey claims that anyone with basic Web development skills can be trained and then build an application in half a day.

Amazingly, customers agree. Rick Caccia, vp of product development at KnowNow, a Versalent partner, says: "After our development team checked it out, they said, 'We always knew someone could do something like this, but they have actually done it.' [Versalent Objects] lowers the complexity level [of building an application] way down to a different level of person. A Webmaster can use it."

We also spoke with happy clients at the Open Finance Corporation, for whom Versalent built a custom application for integration of financial data from various data sources, and Sagisaw Technologies, which developed and is now marketing a call center application that integrates disparate CRM solutions, reducing per-call time.

Clients can either license the Versalent Objects application platform and development tools, or hire Versalent to custom-build an application and either maintain it or transfer it to the client. In addition to those mention7ed above, lient include Photoworks, a Seattle photo developer offering a digital photo printing service; Chicago Climate Exchange, which is building a trading platform for pollution credits; and Iconix Pharmaceuticals, for which Versalent built a drug-discovery platform.

Versalent is also partnering with design and development shops, service integrators, and "anyone who's responsible for building an application," according to Peachey. It currently has partnerships with KnowNow, Kenamea and Acuent.

WholeSecurity: Tracking Trojans

WholeSecurity helps protect against online identity theft – not by building a virtual fortress around a computer, but by patrolling the environment in which that computer interacts with corporate resources and Websites. Founder and cto Tony Alagna developed the technology after discovering that his online security auditing company didn't have the tools to stop millions of dollars in losses for one of his large banking clients. He was able to see after the fact that the losses were caused by a Trojan horse intrusion, so he founded WholeSecurity, funded with about $500,000 from angels, to focus on that specific problem.

There are three primary aspects to protecting identity during an online transaction, according to president and ceo Pete Selda: protecting personal information while it is being typed, protecting the information while in transit, and preventing the user from entering information at a spoofed version of a Website. Secure Socket Layer covers the second aspect, and WholeSecurity is looking to handle the other two.

Using a Trojan horse or other eavesdropping software, an identity thief can see (or set up a program to capture) every keystroke on an infected machine, including passwords. If a user logs into a Website protected by WholeSecurity, however, she automatically downloads a small (175 Kb) security client that scans the machine for active processes that exhibit behavior typical of Trojans. If any are found, they are disabled. The client includes 70 detection modules so far, and any updates are propagated automatically and transparently every time the user visits a WholeSecurity-protected Website. "We knew our clients' users would not be using just one machine. They might log in from online kiosks or Internet cafes. So it's not about controlling a particular machine, but controlling the interaction," says Selda.

In contrast, most anti-virus software uses signature-detection, virus definition technology that can be easily fooled by making even a minor change to the code, and which relies on the user to keep her virus definitions updated. "Anti-virus software can only find existing [i.e. known] Trojans," notes Selda. "But if you're going to be in this business, you have to fix both the known threats and the unknown threats."

WholeSecurity plans to use a similar client-side approach to defend against spoofed Websites: A visitor to a customer Website would have a menu added to his Web browser that is dramatic enough that he would notice if it was missing. Selda calls it "Web caller-ID," and expects to roll it out in the second quarter. Obviously, WholeSecurity also has to detect any malicious code trying to replace its security products with an equivalent version, and has built multiple self-defense mechanisms into all of its products.

WHOLESECURITY INFO

Headquarters: Austin, TX
Founded: June 2000
Employees: 30
Key metric: expect $5 million in 2003 revenues
Funding: $8.5 million from NEA, Venrock, Trellis and angels including Jimmy Treybig
URL: www.wholesecurity.com

The company plans to sell its solutions via big banks to corporate customers; a consumer version is "not on the horizon," according to Selda. It has two paying clients, Deutsche Bank (15,000 users) and the State of Texas (2,000 users), which pay an annual subscription based fee on the number of users they serve: $59 for one user and down to $1 per user per year for millions of users. Selda is also looking to sell solutions to companies building clientless, secure VPNs. He expects total revenues to reach $5 million this year.

SHOWCASE PANELS

The Tuesday afternoon showcase panels let both the panelists and the audiences explore three topics in greater depth, showcasing a set of newer companies and faces. . . . All three of these areas - open source, social software and ontologies - have both technical and business implications.

Social software: Beyond software

BY CLAY SHIRKY

[*Panel moderator Clay Shirky divides his time among consulting, teaching, and writing on the social and economic effects of the Internet, focusing on decentralized technologies such as peer-to-peer, Web services, and wireless networks that provide alternatives to the wired client/server infrastructure that characterizes the Web. Shirky is an adjunct professor in NYU's graduate Interactive Telecommunications Program, where he teaches courses on the relationship between social and technological network topology – how our networks shape society and vice-versa. Shirky has been writing about the Internet since 1996. Over the years, he has had regular columns in Business 2.0, FEED, OpenP2P.com and ACM Net_Worker, and his writings have appeared in The New York Times, the Wall Street Journal, the Harvard Business Review, Release 1.0, Wired, Computerworld and IEEE Computer. He recently became the head of the technical architecture group for the Library of Congress's efforts on long-term digital storage.*]

Groupware has over-promised and under-delivered, knowledge management has been worse, and untold millions have been spent on irrelevant corporate intranets. Meanwhile, e-mail and IM are still the critical tools for group discussion and collaboration on the Internet. Can't anybody here play this game?

The problem with social software that supports group interaction is that humans are never as predictable as machines, so it's much easier to write a good word-processor than a good collaborative tool. On top of that, businesses have typically invested in social software that is aligned with management's needs (centralized, process-heavy, locked-down) rather than the users' needs (decentralized, flexible, extensible).

Getting social software right means giving up on the grandiose visions of perfect managerial control or immersive virtual worlds. Social software's value is not that it's better than real-world meetings, but that it's a lot better than nothing. Once you accept that premise, all sorts of interesting new questions appear, such as "How can

we encourage or augment face-to-face meetings? What if we assume people are smarter than machines, and build extensions of rather than replacements for human capabilities? What's the simplest thing that could possibly work?"

There is a gulf between the current generation of technology designed for group interaction and what the average user really needs, and a new generation of companies is working to bridge that gap. Taking their cue from people's actual behaviors rather than some idealized projection, these companies are designing simple, flexible, and lightweight tools that help people get what they want from group interaction, sometimes in an entirely virtual fashion (SocialText, Lafayette Project), and sometimes bridging the gap between the virtual and the real (Meetup, nTAG).

George Eberstadt, nTAG: Hello, I'm an ID tag

The most important innovations are often updates of the simplest artifacts. George Eberstadt and his partner Rick Borovoy aim to take the lowly "Hello, My Name Is" tag and turn it into a networking tool. The idea behind nTAG, first developed by Borovoy at the MIT Media Lab, is to let the owners of an nTAG encode their interests in a wearable badge. The badge communicates with other nTAGs in the area, reporting to the user (via a small screen) who the other people are, and what your shared interests are. An amplifying technology, nTAG replaces AI with SI - social intelligence - by offering the users clues about one another, rather than trying to make decisions for them.

The aim is to reduce the I-just-talk-to-the-people-I-came-with problem, and to help people who should meet one another actually do so. Like an attentive host, nTAG tries to help you figure out whom to talk to, and gives you enough information to start a real conversation.

Their firm, nTAG Interactive, will be launching the tags later this spring at an event in Las Vegas at which 2000 people will wear them for three days. Eberstadt will have just a small supply of working tags at PC Forum, and will enlist people attending the panel as beta-testers during the social hours afterwards.

Scott Heiferman, Meetup: Venues and vision

Scott Heiferman founded i-traffic, one of the first online advertising agencies at a time when that concept was new and strange; now it's obvious. After selling the company to Agency.com, Heiferman eventually left and recently founded Meetup, with

another new and strange – and obvious – idea. It's dedicated to using the Internet to broker real-life meetings for groups of individuals who share a particular interest or affinity. The business model is to keep costs low, serve the "meeters" as the primary clientele, and to fund the operation by selling their physical presence to the owners of the venues that host the meetings, such as coffee shops or bookstores. So far, the company has achieved its low-cost goal, signing up over 200,000 members in eight months – and surprisingly, given Heiferman's background, with no advertising!

Heiferman believes that instead of making our social lives entirely virtual, the Internet is increasing the pull for face-to-face meetings among people who are introduced online. As the Meetup FAQ says: "Industry experts, such as Roy Orbison, Bruce Springsteen, and Johnny Cash, have written extensively on the topic and have come to the conclusion that people like the company of other real people." Meetup helps groups from Corvette owners to Slashdot readers to homebirth proponents or "Howard Dean for President" supporters coordinate their own meetings, choosing when and where to get together. Meetup declares "International Meetup Day" for any interest group, enabling groups to Meetup on the same day in over 500 cities in 34 countries. (DISCLOSURE: ESTHER DYSON IS AN INVESTOR IN MEETUP AND SITS ON ITS BOARD.)

Meg Hourihan, Layfayette Project: Blog-mining

Meg Hourihan was co-founder of Pyra, the creator of the original Weblogging tool Blogger, recently acquired by Google. Hourihan has been one of the clearest and most consistent voices on the power and importance of the Weblogging, and is now at work on the Lafayette Project (co-founded with Nick Denton, founder of Moreover.com).

The Lafayette Project (a working title) is based on the assumption that the Weblog movement is becoming a victim of its own success. The sheer volume of material makes it difficult for any reader - experienced or novice - to find stories of interest. The Lafayette Project's goal is to bring weblogs to a wider audience by turning the Weblog network into accessible media – to help people find what's new, and to do so in a personalized manner. They seek to create what Cory Doctorow calls "a mechanism by which you can ask the Internet what's interesting to you." Says Hourihan, "There are two sides to the Weblog equation: writing and reading. We've made it easier for people to write to the Web. But now there!s a glut of fascinating content, and no easy way to navigate it. That's the problem we're addressing." The Lafayette Project promises a beta release, and a name, next fall.

Ross Mayfield, SocialText: Building-block simplicity

Ross Mayfield founded SocialText with the goal of building simple tools that help people get together and get work done. Abandoning the notion of an all-singing, all-dancing groupware tool that would be painful to install and complicated to use, SocialText instead takes its design cues from Weblogs, mailing lists, and wikis (below). By assuming the users know what they are doing when they reject mammoth groupware solutions in favor of mailing Word files around as attachments, SocialText is trying to build the un-groupware - simple software that users can actually use. It combines existing solutions rather than re-inventing the wheel, a strategy best exemplified by SocialText's "Happenings" – business meetings that take place via overlapping uses of simple group tools such as conference calls, online chat, and wiki annotation. These Happenings produce real-time group conversations and shared archives while maximizing remote participation, a claim most groupware has made and failed to deliver on for better than a decade.

A wiki is a collaborative online workspace, easily created and edited by its participants. PC Forum attendees will be invited to use one to post, read and share event-related information before, during and after the conference. On the wiki, attendees can post their bios, identify mutual interests, read and write conference notes, link to resources, and converse with other attendees. Posting to wiki pages is fast ("wiki" is Hawaiian for "quick") and as easy as writing e-mail. Wiki users create and edit pages in real time, making the experience like a brainstorming session. As participants grow and rearrange the wiki, it comes to reflect the interests of the people who create it.

Open Source: Beyond licensing

BY TIM O'REILLY

[*See page 29 for an interview with O'Reilly. He describes himself as the founder and ceo of O'Reilly & Associates, the leading publisher of information about open-source software and host of the annual Open Source Software Convention (Portland, Oregon, July 7-11, 2003). He has long been interested in how early adopter communities such as open-source developers often show us patterns and practices that later crop up in other areas of technology, business or social organization. His vision for open source is for it to become the "Intel Inside" of the next generation of computer applications.*]

Open source advocate Eric Raymond is fond of quoting Gandhi's maxim: "First they laugh at you, then they fight you, then you win." Sure enough, over the past five years, open-source software has gone from being dismissed as a toy to being called a "cancer" and "an intellectual property destroyer" by Microsoft's Steve Ballmer. And sure enough, just as the number of attacks peaked, open source affected market after market. With Linux taking a big bite out of Sun's and Microsoft's ambitions in the server market, we're well into the third stage of Gandhi's march to victory. But is there a fourth?

Even though the industry is now clear that open source is here to stay, there's still confusion about how it works and why it's so important. During the "fight" stage, most of the heat was about open-source software licensing, which ensures that no single vendor has proprietary control over the software. Opponents have claimed that free and open-source licenses, particularly the Free Software Foundation's controversial GPL (GNU General Public License) are incompatible with business. The companies in this panel show why that isn't so.

But the impact of open source goes beyond licensing practices. Much as the commodity hardware of the personal computer forever changed the computer hardware business, open source represents the commoditization of key elements of the software stack, and the transfer of power from vendors back to users or service vendors building custom software on top of that stack.

Open source also teaches us a lot about the nature of software development in the age of the Internet. Open-source projects are inherently distributed – many of the most important projects are managed by international teams – and the best practitioners have developed techniques for collaborative development that are now being applied by proprietary software vendors and other development organizations. If you have a large enough development group, with high-bandwidth Internet connectivity, you often see open-source-like social dynamics even among the most proprietary of companies.

The participants in this panel are uniquely positioned to discuss the deeper, long-term implications of open source. All make heavy use of open-source software in their business, but none of them is a classic "pure play" open-source company. All of them combine open-source and proprietary software licensing, and each of them leverages one of the deeper trends that open source lays bare: collaboration (CollabNet), hybrid licensing models (MySQL), and the use of open source as a platform for proprietary services (Amazon.com).

Brian Behlendorf, CollabNet: Open process

Brian Behlendorf was one of the early Web pioneers as Webmaster for HotWired and co-founder of Web hosting and design firm Organic Online. He built Organic around the popular free Web server from the National Center for Supercomputer Applications (NCSA) at the University of Illinois. When the NCSA team abandoned it to seek their fortunes at Netscape, Microsoft, and other startups, Behlendorf and other NCSA-dependent business owners started a mailing list for sharing patches. This list grew into what has become one of the world's best-known and most successful open-source projects, the "patchy" Apache Web server.

While other Apache team members founded companies to create commercial versions of the Apache product, Behlendorf concluded that the real opportunity might just be to productize the Apache process. CollabNet, which Behlendorf co-founded with O'Reilly's company O'Reilly & Associates, builds tools for collaborative software development and management of developer communities.

CollabNet earns revenues from hosting and managing collaborative development projects and associated consulting services. It is perhaps best known for hosting corporate-sponsored open-source projects such as Sun's openoffice.org, netbeans.org and jxta.org, plus Real Networks' helix.org, but where it's really making an impact is within enterprises. For example, Barclays Global Investors' BGI Developer Network uses CollabNet's platform and methodology to recreate open-source dynamics across BGI's internal development groups worldwide. HP's Collaborative Development Project, also based on CollabNet, goes even further: It allows HP employees worldwide to collaborate on projects, but also securely integrates external business partners and customers. Some wags call this model "gated open-source development."

Marten Mickos, MySQL: An oracle for open source

Marten Mickos is ceo of MySQL, the vendor behind the open-source MySQL database. MySQL is now one of the world's most popular databases in number of installations and threatens to do to Oracle what Linux is doing to Sun's Solaris and other proprietary server operating systems.

MySQL's dual-licensing strategy demonstrates how GPL and proprietary licensing can effectively be combined to provide free distribution of commodity software while allowing proprietary added value. For instance, MySQL (and UI vendors such as Trolltech) distribute a public version of their software under an open-source license, but because they own the copyright, they are also able to license their prod-

ucts under proprietary terms to companies that integrate them into combined commercial systems. Mickos estimates his "working installed base" at 4 million copies – conservative given that the site downloads more than 10 million copies a year, and about 10 million more are shipped within Linux distributions and other products. On the other hand, the company has 4000 paying customers. They include Yahoo!, Google, Cisco, Novell, Sun, the US Census Bureau, NASA, Cox Communications, Veritas, Hyperion, Associated Press, Volvo and Ericsson. The Human Genome Project and the state of Rhode Island are users of the free version. Look around and you'll find open-source databases and GUIs built into mobile phones, cash registers, home electronics and even cars.

Al Vermeulen, Amazon.com: Open flows Amazon.com

Al Vermeulen is cto of Amazon.com, one of the Web's great success stories. Amazon is hardly a start-up, but underneath its huge e-commerce presence, Amazon's technology team is constantly building new businesses. Like other Web pioneers such as Google and Yahoo!, Amazon is built on an open-source foundation - in Amazon's case, Apache, Perl and Linux – on top, Amazon uses proprietary technology including Oracle and BEA's WebLogic, and as well as Sleepycat's Berkeley database software that fits in between.

"For Amazon, open-source technology provides two competitive advantages," says Vermeulen. "First, it lets Amazon use commodity hardware and software, leading to the most important advantage: lower cost. Moving to an Intel/Linux platform has reduced our capital and maintenance costs by an order of magnitude. Reducing costs in infrastructure is an important part of our business model."

He continues: "The second advantage is speed. We aggressively roll out new innovations to surprise and delight our customers. With open-source technology we can integrate important fixes and feature enhancements at our pace – rather than at the pace of our vendors."

Vermeulen will also explore how Amazon is trying to build an open-source developer ecosystem around its platform using a Web services API. Who says there aren't any applications built on open source?

Onotologies: Beyond database

Ontologies truly make data come alive; just like living systems (or profitable companies), they produce more than they take in. If you feed an ontology a given amount of data, its reasoning powers can produce more information than you entered. This means not just crunching data to produce an invoice, but crunching models to make inferences. That enables users to do everything from data integration and re-engineering to complex modeling and design tasks - not only for physical products, but also for commercial relationships, workflows and perhaps one day of business processes. The models in themselves are interesting, but what makes them useful is that they can be used as tools both to implement processes in software, and to redesign what has been modeled.

COMING SOON

- Digital garbage.
- Social software.
- RFID in action.

- And much more. . . (If you know of any good examples of the categories listed above, please let us know.)

In the old days, information was painstakingly entered into ontologies by domain experts, such as those who worked at Cycorp, the leading ontology research project that is now a for-profit company (though it still does a lot of research). Today, much of the information comes through Web services interfaces - the best way of handling the complexity and volumes of data that make ontologies both useful and in the long run necessary. Without data representation standards, the difficulties of seamlessly integrating the processing capabilities of traditional systems and the reasoning power of ontology-based systems would be almost insurmountable. Beyond that, the spread of ontologies will require not just agreement on technology, but also on domain expertise, as Jon Matonis of Network Inference notes below. (FOR MORE ON THE OVERALL TOPIC OF ONTOLOGIES, SEE **RELEASE 1.0**, FEBRUARY 2003.)

Dwight Lodge, enLeague: Fizzy logic

Dwight Lodge got his grounding in ontology at Cycorp, where he was ceo from September 2000 to September 2001. But before that he was no academic: He had worked as a VC and buyout man in New York, where among other things he bought and rolled up a group of telephone-billing service providers. Now he's back in the complex world of business, dealing with the intricacies of Coca-Cola's sales and billing data at enLeague, a start-up partially funded by Coca-Cola.

EnLeague offers the Semantic Integration Broker, a platform that translates between ontology-based models of Coke's customers, partners and distribution system, and

the legacy computer systems that actually accomplish the work of billing, invoicing and accounting. (FOR FURTHER DETAILS, SEE **RELEASE 1.0**, FEBRUARY 2003.)

Now enLeague is looking to expand into other markets and other customers. The company has just purchased Killdara, a Canadian XML messaging platform company that will be working with EDS to implement the Canadian government's nationwide Smart Systems for Health Initiative. This is just the first of a number of new initiatives, says Lodge.

Jon Matonis, Network Inference: Ontology requires harmony

As it happens, one of the tools enLeague is using at Coca-Cola is Network Inference's ontology and logic layer engine, Cerebra. Based on FaCT, one of the leading academic description-logic engines, Cerebra has been refined to optimize for commercial capabilities such as speed, scalability and predictability. The company has a number of commercial customers in addition to enLeague, including Clinician Support Technology (medical), and Qinetiq, the commercial arm of the UK Ministry of Defense, specializing in defense, aviation, and energy projects. Network Inference is also working with IBM's T.J. Watson Research Lab.

Network Inference ceo Jon Matonis earlier worked at VeriSign, where he learned about the importance of trust and of bottom-up networks. He sees vertical domain experts ratifying objective ontologies and also creating a separate cottage industry for ongoing ontology development. "Pharmaceuticals, clinical healthcare, and financial services are early adopters for Network Inference because of the existence of explicit, mutually agreed-upon global ontologies," he says.

In memory of Sam Albert, a wonderful friend and loyal supporter for over 25 years. We'll miss you, Sam!

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ADDENDUM

ESTHER DYSON'S MONTHLY REPORT

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IMlogic: Making IM safe for the world

BY CHRISTINA KOUKKOS

Many CIOs think killer app is an apt name for instant messaging. They'd like to kill it. IMlogic has a different idea: Tame it and harness it by adding "security, visibility and control to IM networks without requiring users to change their behavior," explains IMlogic founder and ceo Francis deSouza.

"We recently got a call from [a large technology company]," he recalls. "After the CIO had shut down access to IM networks because of a virus scare, he started getting calls from salespeople telling him he had to open it back up. They had been using IM for customer support and servicing, and he had cut off that communication link." DeSouza, an instant messaging (IM) veteran, left his position as head of the Microsoft Real-time Collaboration Group in early 2001 to found IMlogic and solve this very problem. Its first product is the IMlogic IM Manager, launched in September 2002.

IMLOGIC INFO

Headquarters: Waltham, MA
Founded: March 2001
Employees: 35
Key metric: 20 customers
Funding: $17.75 million from General Catalyst, Kodiak, Venrock and Goldman Sachs
URL: www.imlogic.com

Unlike some of its competitors, it does not create a separate enterprise IM network, which would position it as a competitor to existing IM networks such as AOL, Microsoft and IBM/Lotus. Instead, it inserts a control layer between the user and the network. All IM traffic in an enterprise is routed through the IMlogic gateway server, allowing it to execute security and control policy: virus scanning, blocking file transfers, selectively allowing access, and so on. The proxy then archives a copy of the OK'd transmission in a SQL server and sends the message on its way. It also stores information for reporting: which IM networks are being used, usage patterns for specific employees or departments, and so on.

IMlogic currently supports the Microsoft, Reuters, Yahoo!, Jabber and IBM networks, with at least one additional deal in the works for the second quarter. The company claims over 20 customers, including Bear Stearns, Merrill Lynch and others "mostly in the Global 2000," according to deSouza. "Financial services companies have been the most aggressive about buying."

Later this year, it expects to launch an IM application server to connect existing applications to IM networks. Of course, the company also sees a future in mobile IM networks. It plans on piggy-backing on its existing IM network partnerships rather than partnering with mobile operators. "All the IM networks are aggressively pushing wireless plans, and we're part of that," says deSouza.

IMlogic replaces Rapport Technologies in the agenda, presenting on Monday afternoon in Salon A at 4:15 pm.